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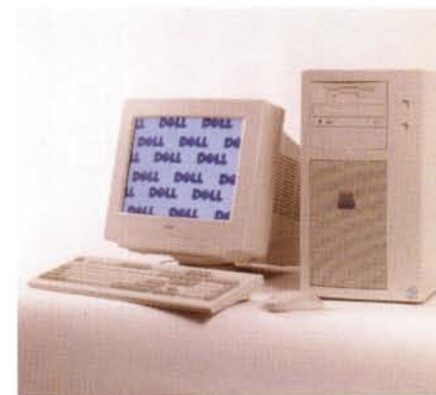
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BECAUSE IT'S YOUR STUFF



It's all just software

While the competitive issues surrounding Microsoft are serious and real, there's still plenty of healthy competition in the 'software' market.

By Jeremy White

Competition in the PC software marketplace is far more vibrant and competitive than most press reports I've read throughout the ongoing Microsoft legal wars recognise.

You could be forgiven for thinking otherwise, of course. On the face of it, Microsoft completely dominates PC software. Who uses anything but Office and Windows as a standard desktop and application suite? Why is Netscape losing market share to Microsoft so quickly? Why has NT Server so rapidly taken over from NetWare as the standard network operating system?

Things are healthier than they seem, however.

The fact is, more than anything, today's PC software development takes the form of Web sites. And the boundaries between Web sites and traditional off-the-shelf applications are quickly blurring.

Personal finance software is a strong example. Let's compare the only two major commercial consumer packages now currently on the market, Intuit's Quicken and Microsoft Money. They demonstrate a number of trends with broader applicability.

These packages are becoming 'holistic'. A personal finance suite isn't just a general ledger program and cheque printer; it's a family of applications, charting and forecasting tools, and, increasingly, books, information and expert advisory systems. They are also increasingly, at least in their US forms, linked directly online.

When you fire up Microsoft Money 98, the application uses a Web interface. You are presented with a personal finance home page, with links to each of the program's sections. The home page features the latest financial news highlights (updated from the Web regularly) and links to book-like articles about how to get control of your finances (also updated

from the Net regularly). In addition, your finance home page features a 'chart of the day' showing some aspect or another of your finances, plus advice — also based on your current financial data — about how you personally can clean up your act.

This is a universe away from the old chequebook-mimicking programs like Checkmate that were simple registers.

But one of the most interesting things of all that is noticeable with the new Money is that, while it offers advice and help along with its accounts and registers, its real purpose is to act as an online banking management tool. This, above all, is a front end for paying your bills and managing your day-to-day banking transactions online.

Much the same applies to the new US version of Quicken. While Money is essentially a friendly banking front end, Quicken retains its heritage as a serious financial analysis tool, but adds electronic bill paying and account management, as well as online updates of news highlights and finance advice and analysis.

Now, all this is great if you live in the US, where each program has 60 to 100 banking partners online. Australia has slim pickings: the Advance, Adelaide and Commonwealth banks offer good, basic online banking, especially Advance, which also has the new BPay electronic payments system. But while these banks let you download statements and even pay bills, none is fully integrated with Quicken and Money as the US banks are. In the US, the entire process can be managed from your personal finance program itself. This area is hotting up, though. In March ANZ goes live with Net banking, including online categorisation and bill payments, and Westpac and NAB are also piloting plans. Each of these are mini personal finance programs.

When that happens, the real power

will arrive. Once you have a personal finance front end (Money or Quicken on your PC, or maybe an entirely online solution through your bank), the Web-based finance sites tied to these packages will provide the real long-term action.

Quicken.com offers its US audience not just news and advice, but stock quotes and trading, online mortgage applications and pre-approval, insurance comparison shopping, and a host of discussion, advice and help forums. Plus, it offers online financial analysis tools: work out a debt reduction plan; forecast your retirement needs. Microsoft, for its part, offers Money-Insider as part of MSN, plus Microsoft Investor for online trading.

All this stuff is straight, old-fashioned personal productivity software, it just happens to also be distributed multimedia over the Web.

The real competition is taking place online: The Wall Street Journal Interactive, AOL and even Ziff-Davis are also all offering finance and investing sites — sites that are really software productivity tools. In Australia, the Web sites for Channel Nine's 'Money' show, Seven's 'Personal Investment', *Your Mortgage* magazine, and many others, are heading the same way.

So these days, if you're interested in personal finance software, you might initially think that you only have a choice of two. But while there may only be two off-the-shelf packages, when you consider the online offerings, the real number is much greater.

I'll bet 10 to 1 that while your Windows Start menu might be full of Microsoft programs, your browser's bookmarks list has a much healthier array of companies represented.

Of course, just because software development on the Web displays healthy competition at the moment, it doesn't mean things will stay that way. ■

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SPAM BELONGS IN A CAN

Net abuse by spammers is no trivial problem, and one that increases exponentially. It's annoying and intrusive, plus it wastes our time and money — and bandwidth. The culprits tend to get off scot-free, while ISPs and other victims cop it from irate email users who have been 'junked'. What protection is there against the tyranny of junk mailers? 74

By Dan Tebbutt

Put spam back in the can. 82

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DEFENDING THE PUBLIC SPHERE

Geert Lovink's anticapitalist background has naturally led him into the fight to keep the Internet independent. "Big companies are taking over at this very moment and it is in their interest to turn the Internet into an old-fashioned, one-to-many medium, turning users into passive consumers."

By Selina Mitchell

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TECHNOLOGY ZEALOTS

There are many kinds of technology obsessions — the streets are crawling with DOS devotees, Mac zealots and Web junkies. It makes you wonder how a simple PC can incite such passion.

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Love to hate you

By Angus Kidman

Isn't it just a browser?

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The revolution in 2D/3D graphics cards is upon us, as high-performance 3D accelerators come into play.

By Nathan Taylor

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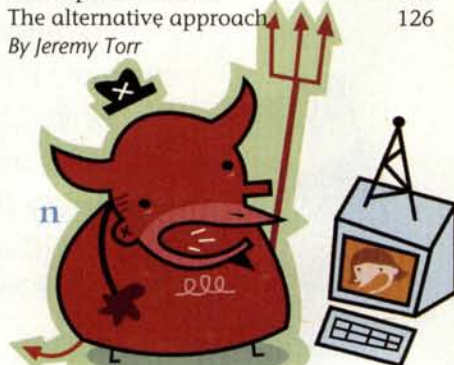
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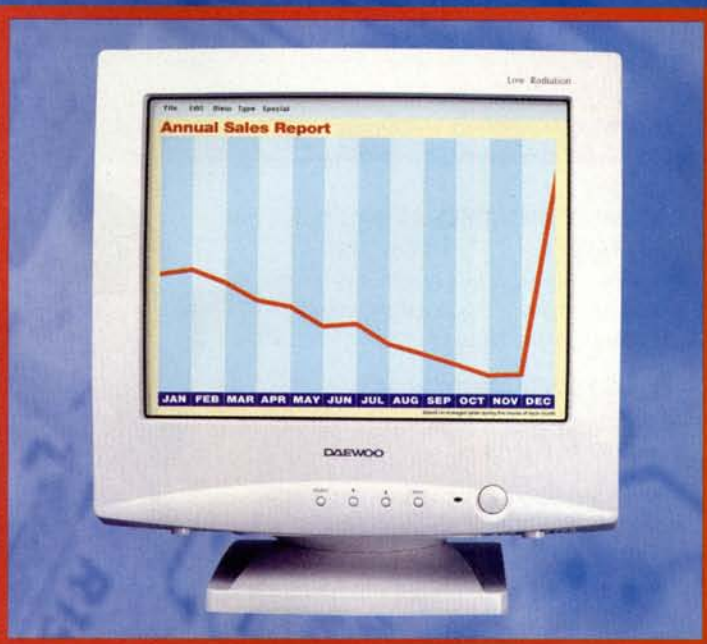
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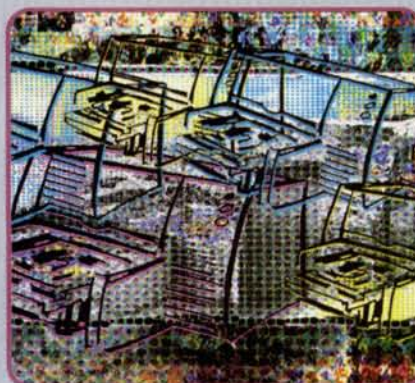
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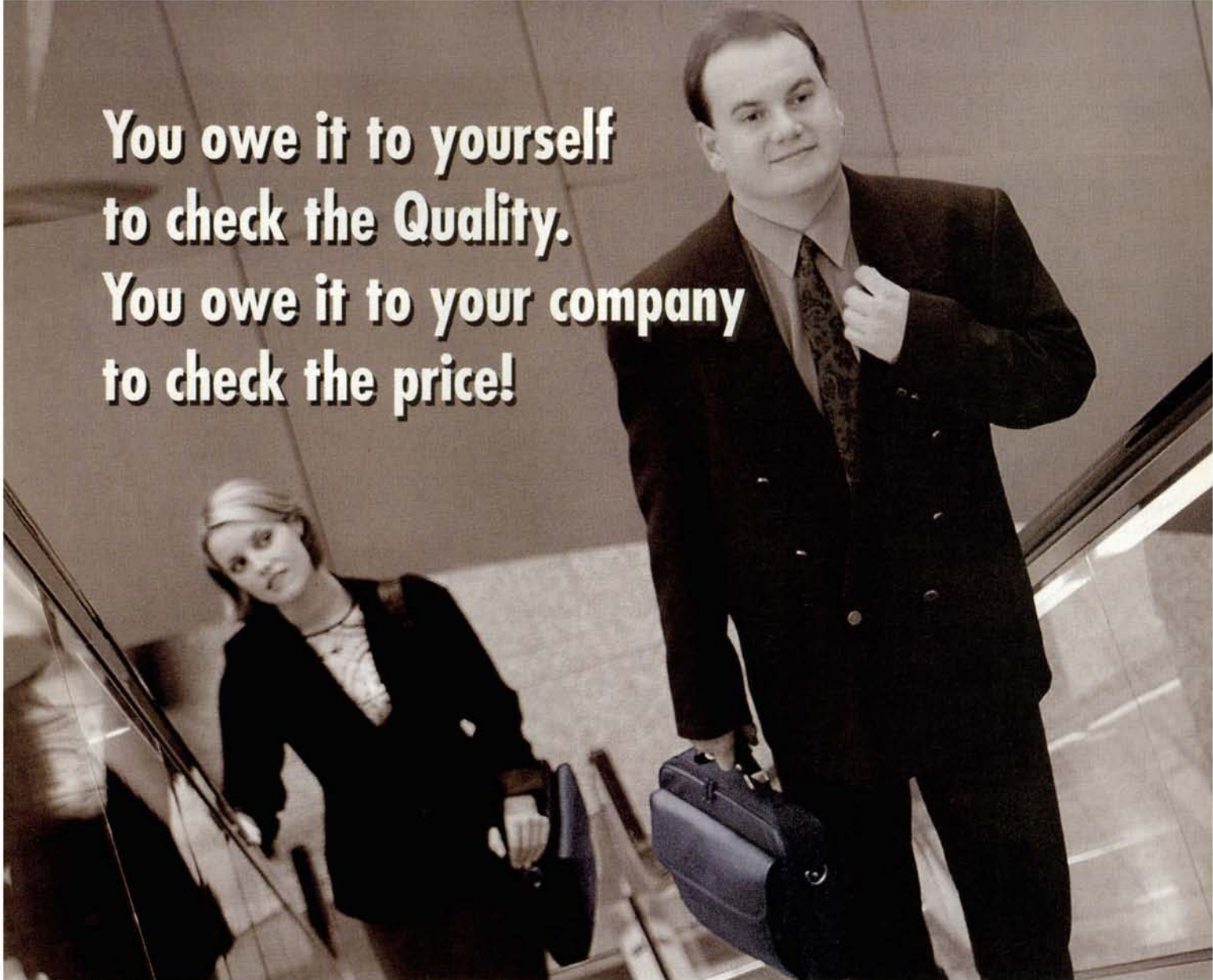
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Volume 3.3, March 1998

This month, **apcmag.cd** presents the winning Australian software packages from the 'Small Business Show' on Channel 9, along with shareware to protect your PC from unwanted access and tools to stop unwanted emails from reaching your desktop. All this, plus new games and more are on our March CD.

Telstra Big Pond

If you want to use Telstra's Big Pond service, read the detailed information on the CD, or if you want to sign up, load D:\isp\bigpond\setup.exe.

Security: AppLok95 ■ Blowfish Advanced 97 1.03 ■ Clasp97 2.1.2 ■ Crypt-o-Text 1.24 ■ DataGuard 1.5.2 ■ DataSAFE ■ Desktop Surveillance 2.16 ■ Encrypted Magic Folders 97.10a ■ Guardian 1.2 ■ Password Thief 1.0 ■ Password Tracker Deluxe 3.22 ■ PrivaSuite 3.1 ■ RedHand ■ Secure Communicator 4.0 ■ Security Setup 1.0 ■ SecurityPlus! 4.11 ■ The Lock 98 ■ The Watchman 1.3 ■ Win-Secure-It ■ WinU 4.1b ■ BigSecret 4.2 ■ DiskLocker 1.3 ■ Keep Out! 1.1.1 ■ MacLocksmith 2.0.1 ■ The Block 1.6.3

Small Business Show Awards: LiquidFX ■ Millennium Master ■ ShortCuts Salon Management ■ Summit Event Management System

Reviews: Interceptor ■ Spam Attack Pro 2.51 ■ Spam Exterminator 2.7 ■ Spam Hater 2.07 ■ SpamKiller 1.6 ■ SpamScan97 1.0.2.923 ■ Spamicide 1.0 ■ SpammerSlammer 1.1R ■ Mailjail 2.0 ■ MailTalkX 2.2

First Take: Trellix 1.0

GameZone: Defiance ■ Falcon 4 ■ AFL 98 ■ Cricket 97 Ashes Tour Edition

Workshop: ChemLab 1.2a ■ Digital Challenge ■ WinFlash32 5.0 ■ Write All About It! for Windows 2.1 ■ The Writer's Software Companion Demo ■ Apple Error Codes 98 ■ Keep Out! ■ Yank ■ Lush ■ Clone-Cleaner 2.30 ■ FM/2 Utilities ■ GammaTech Utilities for OS/2 3.0 ■ McAfee VirusScan for OS/2 3.12 ■ The Graham Utilities Light for OS/2 ■ CMU-SNMP ■ Big Brother ■ Scotty ■ MRTG ■ Statnet

Bandwidth Busters: pcANYWHERE 8.0 ■ Sidekick 98 ■ Microsoft Internet Explorer 4.0 for Mac

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Net Kit: ARJ 2.55 ■ Adobe Acrobat Reader 3.01 ■ Anarchie 2.0.1 ■ Anawave Gravity 2.0 ■ CRT 2.0 ■ CleanSweep ■ CuteFTP 2.0 ■ EMX Ping ■ Eudora Pro 3.03 ■ Finger 1.5 ■ Forte Free Agent 1.11 ■ GT IRC 2.0 ■ Gibbon Finger ■ IRCLE 3.0 ■ InterNews 2.0.2 ■ Ircll 2.8.2 Beta 3 ■ LA Gopher 1.1 ■ LHA 2.55b ■ LHARC 2.22 ■ Mac Ping 3.0.2 ■ MacBinary II 1.0.1 ■ MacGZIP 1.1 ■ McAfee VirusScan ■ Microsoft Mail and News ■ NCSA Telnet 2.7b4 ■ NcFTP ■ Net Term 4.2.1 ■ Norton AntiVirus ■ Nuntinus 2.04 ■ OUI 1.8 Beta 6 ■ Open Chat/2 1.06 and much more...

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APC Readership Survey prize winners

APC conducted a readership survey in the September 1997 issue. In conjunction with the survey we held a competition, offering five US Robotics' PalmPilot PDA packs, courtesy of Swann Communications. APC would like to thank all of our readers who completed the survey and we congratulate the winners. The winners of the PalmPilot packs are:

C S Yong
Thomas Malcolm
Pauline Dobson
Rob Nicholls
Sean Whitley

For more information on the PalmPilot Professional packs, call Swann Communications on (03) 9521 2811.

Microsoft games winners

The winners of the Microsoft Games Competition 1 run in APC January are:

Jonathan Healy
Steven J Eccles
Mark Thompson
Mark Beare
Stuart Lamond

Winners will receive a copy of Age of Empires, CART Precision Racing, Close Combat II and Flight Simulator 98, as well as a Precision Pro Joystick. All products are courtesy of Microsoft.

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APC Labs looks at DVD kits.

Does removable storage deliver?

Web servers: The core of your Net strategy.

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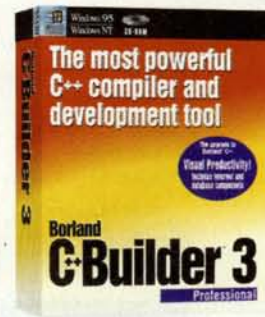
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IE UNDER FIRE

Microsoft braces for more scrutiny

While Microsoft has managed to reach a compromise on one aspect of its ongoing battle with the US Department of Justice (DOJ) over Internet Explorer licensing, it will face increased scrutiny over the coming months, with numerous US state attorneys-general and the Japanese government joining the list of organisations investigating whether the company has used anticompetitive tactics.

On January 22, the DOJ and Microsoft announced that they had reached an agreement on how Microsoft should comply with a preliminary injunction requiring Microsoft to make available a version of Windows 95 which did not include Internet Explorer (see APC February, page 22). Microsoft initially offered OEMs a choice of the original 1995 release of Windows 95 or a version with IE removed which was unable to even boot. The DOJ in turn sought a contempt finding against Microsoft, claiming that its response was a 'mockery' of the injunction.

Under the revised plan, Microsoft will offer PC vendors the option of removing the Internet Explorer icon from the desktop while leaving most of the underlying system files relating to the browser intact. Vendors may also ship a version of Windows without the files which are removed when the 'Remove program' option in the Windows 95 control panel are applied.

Continued on page 16

LOCAL UPTAKE DOESN'T MATCH AMERICA

Web shopping grows, slowly

Christmas is always a big season for retailers, but the 1997 holiday season also saw a surge for those stores selling merchandise over the Internet. One recent survey of Web merchants found that 9 million Web surfers bought more than \$US1 billion in goods during the last quarter of 1997, and \$US750 million more during the Christmas retail period. Web prodigy Amazon.com, always a good example of the Net's shopping potential, achieved revenues of \$US66 million during the last three months of 1997, a 680% increase over the same period in 1996.

Australian sites have yet to perform anywhere near as well as Amazon.com, but a spate of new online initiatives could be enough to lure many more Australian shopping dollars online this year. However, while consumers may be ready for the Web, most local companies are just beginning to explore the potential of online shopping.

"It's just an experiment," said Mark Thawley, who owns Melbourne bookstore Webber's Booksellers and recently set up a Web page through the Advance Bank's ShopLink site. "I've gotten a bit of interest, but I have to spend more time building it up before I can judge whether it's worth it."

"The Web isn't a big part of our busi-

ness," agreed Peter Brown, who owns discount pharmaceutical supplier Pharmacy Direct and recently set up a Web site in ShopLink. "It's happening, and it's out there, but people are still a bit slow to adapt to online shopping. We're getting



more and more information-type questions via email as people become aware that the Web lets them ask anonymous questions to a pharmacist. However, I'm sure [online shopping] is going to be bigger as time goes on."

Services like Advance Bank's ecash may hasten customer acceptance of online shopping, Brown noted. Customers can convert money from their bank accounts into PC-based ecash. According to Advance Bank electronic banking

Continued on page 16



News Roundup

Former Novell and Intellect managing director Graeme Inchley will head a Federally funded taskforce to advise business on year 2000 compliance. The Year 2000 Initiative is a project conceived and funded by the Industry Development portfolio of the Department of Industry, Science and Tourism (DIST), in recognition of the significant impact that the millennium bug could have on indus-

try in Australia. DIST will fund the project to the tune of \$5.5 million over the course of its two-year life, and a spokesperson told APC that its primary functions will be building awareness and providing advice on compliance.

A recent dispute between the Australian Cricket Board (ACB) and the ABC's Radio Australia (RA) over Netcasting has highlighted the many grey areas that still need to be addressed before the fledgling medium can take its place alongside tradi-

tional broadcasting. The dispute arose in January when the ACB requested that RA cease Netcasting its ball-by-ball coverage of cricket matches, an activity it had been engaged in since the start of the 1997/98 season. The ACB contends that the Netcast coverage breached the terms of a 1994 contract that specifies that the ABC's licence was for radio broadcast within Australia only. The ACB's divisional marketing manager John Fouvy said the ACB didn't want to appear heavy-handed, but said

TIMELINE: Microsoft versus the DOJ

■ 1995

Microsoft signs original consent decree with DOJ

■ 1997

October 20

DOJ files suit against Microsoft

November 11

Microsoft files response to DOJ suit

December 11

Preliminary injunction issued against Microsoft

December 15

Microsoft appeals preliminary ruling

December 17

DOJ files contempt finding against Microsoft

■ 1998

January 22

Microsoft and DOJ settle dispute over injunction

May

Special master due to report

Microsoft braces for more scrutiny

Continued from page 15

DOJ attorney Joel Klein told reporters that the deal sends a clear message to other software vendors that they should not be "snuffed out by Microsoft's monopolistic power".

While the agreement settles one of the aspects of the case, Microsoft's appeal against the original injunction remains intact. Both sides stressed that the larger legal issues raised by the DOJ — including whether or not Microsoft broke its original consent decree, and Microsoft's appeal against the appointment of a special master — also remain unresolved.

Whatever the outcome of the current case, though, Microsoft is having to prepare for a bevy of similar investigations.

Eleven separate states in the US have requested documents relating to the development of Windows 98, which includes a high level of integration between IE and the

operating system and is due for release later this year.

And the US is no longer the only area where Microsoft is facing scrutiny. Japan's Fair Trading Commission (FTC) has commenced an antitrust investigation into Microsoft's bundling practices. The investigation was sparked by a bundle offered by Microsoft to Japanese OEMs consisting of Word and Excel.

FTC officials have said that Microsoft is under investigation because of complaints that it barred OEMs from shipping alternative software on their machines, thereby causing a restraint of trade. Microsoft disputes the FTC's claim, saying that it was simply competing in compliance with Japan's trade practices law.

Microsoft is also under investigation in Europe, and a preliminary inquiry has been established in South Korea.

**Angus Kidman and
Josh Gliddon**

Web shopping grows, slowly

Continued from page 15

development manager Edward Breese, around 1,500 users have purchased \$35,000 worth of ecash since the service's launch last July.

Telstra's six-month-old SureLink positions the company as an intermediary for online transactions. According to Paul Clarke, general manager of Melbourne-based retail chain JB Hi-Fi Australia, technology like SureLink is a big step towards luring Australian shoppers online. "With the amount of effort we've put into the site, we're happy with the results," he said. "People are certainly buying online; it's just a shame the Internet has been linked with a perceived security risk. We're satisfied with [Telstra's] credentials and the security factor they profess to have."

Regardless of sales volumes, even the smallest outlets are benefiting from the international exposure the Net can provide. Brown has shipped goods to customers in Alaska, Denmark and the Netherlands, and despite his site's nascent state, Thawley has even taken orders from customers in the US.

SureLink, ecash, and the upcoming launch of SET secure credit card technology could make 1998 the year Australian companies begin to take the Net seriously. However, widespread online suc-

cess will require aggressive online campaigns by larger Australian retailers. "People spend a lot less time on the Net in Australia than in the US," said Breese. "Merchants need to understand they have to provide a more compelling online experience than in the real world to get people online."

That's a big ask, considering that most Australian companies continue to ignore the Net's commercial potential. Coles Myer, for example, is one of the country's biggest retail chains but offers no online shopping services for its dozen or so retail brand names. And, despite a steady trickle of online sales, David Jones recently closed its Web site pending a strategic realignment.

Companies that do get the Web are laughing, as online sales grow their revenue base with minimal outlay. Consider Melbourne retail chain Nick's Wine Merchants, which launched its site four years ago. Although Nick's representative Simon Chlebnikowski remains tight-lipped about how much stock is being sold online, its continuing Web investment may be indication enough of the venture's success. "We're in it for sales, not just for public exposure," Chlebnikowski said. "If you know what you're doing, you can do well online."

David Braue



News Roundup

that the ABC's Netcast potentially compromised agreements with overseas broadcasters. Both parties are currently working on a resolution to the problem.

Apple Computer has taken a chainsaw to its software subsidiary Claris, pruning the profitable junior partner for sharper focus on its blossoming database business. Claris will be renamed FileMaker after its

flagship database offering. The bad news for Claris staff is that 300 jobs will be axed, with five of the six Australian Claris staffers talking a walk. Managing director Steve McManus remains in place, and is hoping to have the renamed company fully operational by April.

Prompt delivery of products is the most important aspect of the relationship between PC resellers and major PC vendors, a survey of store managers in the Asia-Pacific region has found. The study,

carried out by Dataquest, found that 53% of those surveyed felt that the ability to deliver products promptly had a much greater impact on their overall profitability than the basic profit margins set by different vendors. There was, however, widespread variation in this view across the region. While 70% of Australian resellers surveyed agreed with the greater importance of prompt delivery, only 40% of resellers in Thailand and China felt the same way.

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SUPPORT STOUSH

NDS and NT cross swords

A recent battle between Microsoft and Novell over support demonstrates that the likelihood of a single directory standard being adopted by the two companies is still slight.

In late January, Microsoft posted an announcement to its Web site saying that it would be unable to support customers who chose to install Novell Directory Services for Windows NT. Microsoft claimed that the product altered two key DLLs within NT, rendering it insecure and liable to failure.

Novell countered with a stinging response, pointing out that only one DLL was actually affected and pledging to support customers who chose to install the product. The move by Microsoft was widely interpreted as an attempt to stop customers using the Novell offering in preference to its own Active Directory technology, which has yet to be released.

A statement placed on Microsoft's Web site a week later retracted the original claim, announcing that Microsoft would offer NT support to customers who had installed

NDS. However, it warned that security and directory issues might be referred back to Novell. Microsoft also conceded that its claim that two DLLs were affected was incorrect, and resulted from examining beta code rather than the final release of NDS for NT, which became available in November.

Microsoft also claimed on its site that Novell could have avoided the problem by devising a directory interoperability solution based on its own Active Directory Services Interface (ADSI), which it describes as "the industry standard for accessing directory services from any vendor". However, as the name indicates, ADSI is a Microsoft technology, and will not be fully supported until NT 5.0 is released. Current estimates suggest that this will not occur before the end of 1998.

Both Microsoft and Novell are committed to implementing the Lightweight Directory Access Protocol (LDAP) in their respective systems, but the recent battle suggests that this alone will not be enough to ensure enterprise customers can deploy both products.

Angus Kidman

CABLE SNUBS SINGLE SOURCE

MS and Sun in set-top battle

The pay TV industry looks set to play Microsoft and the Java coalition off against each other to ensure neither controls interactive customer premises equipment, following recent deals for set-top box software.

TCI, the largest cable operator in the US, announced in January non-exclusive agreements to use software from both Microsoft and Sun in its set-top boxes (devices installed in homes to enable interactive services over cable networks).

Microsoft's Windows CE will be TCI's operating system of choice for more than 5 million CPE units, but the software giant's influence will be dampened by the need to coexist with Sun's PersonalJava. The Java environment was chosen as TCI's principal development platform, partly because it buffers the cable giant against excessive reliance on any underlying hardware or operating system.

CE and Java will be used on hardware designed by General Instruments (formerly called NextLevel Systems), which has contracts to supply more than 15 million set-top boxes over

the next three years to TCI and other major US cable operators including Cablevision, Comcast, Time Warner and Cox Communications.

TCI's move allows it to match Java's development benefits with the more established reliability of CE, now in its second generation. TCI senior vice-president Bruce Ravenel was quoted as saying he expects PersonalJava software to run properly on CE, even if it is not a 100% Pure Java environment. CE does not currently have a Java Virtual Machine (JVM) to execute Java applets, but at Comdex Microsoft consumer platforms general manager Harel Kodesh promised a JVM "shortly".

Significantly, TCI remained faithful to a July agreement among cable providers called the OpenCable interface specification. That document proposed that the cable industry should design boxes which are independent of any single source OS, software or hardware. This was seen as essentially a response to Microsoft, which has invested billions of dollars in cable companies and acquired start-up WebTV. **Dan Tebbutt**



News Roundup

With the end of the year, a slew of technology companies have been reporting their full-year financial results. While many companies, including Gateway 2000 and IBM, made a good showing, there were a number of poor performers, including Netscape (whose annual net loss of \$US115 million prompted a major strategy shift) and Sybase (where an accounting error in the

Japanese subsidiary led to a substantial restatement of results and a net loss of \$US55 million over the year). Netscape has responded to its troubles by laying off swathes of staff worldwide and announcing plans to make Communicator available for free and give developers unlimited access to its source code. For weekly updates on the latest IT financial results, head straight for **apcmag.com**'s Cashbook column at <http://apcmag.com/cashbook>.

Complete versions of all these stories can be found on the **apcmag.com** Web site. For regular updates on what's happening in the world of computing, check out our breaking news stories throughout the week at <http://apcmag.com/news>. And don't forget our weekly Highlights from the Wire roundup, posted every Monday at <http://apcmag.com/direct> and available via email.



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RIVALS AGREE

56K wars reach truce

The long-running war over the creation of a single 56Kbps high-speed modem standard is almost over, with rivals 3Com and Lucent agreeing to adopt a single standard and begin interoperability testing of their 56Kbps products.

A 56K standard known as x2 has long been supported by 3Com, along with its US Robotics division, while Lucent has aligned with Rockwell in promoting the rival (and incompatible) K56Flex standard. Uptake of the high-speed technology has been delayed as users and ISPs wait to see which will predominate.

The new agreement by the two rivals comes in the wake of an announcement in December by the International Telecommunications Union that it would be promoting a combined standard, V.pcm, which combines elements of both the x2 and K56Flex proposals.

Local market leader Sirius Technologies (formerly NetComm) has welcomed the new combined standard. "A draft standard will have a decisive impact on the market by removing users' fears of incompatibility," managing director David Stewart said. **APC staff**

SERVICE THE JEWEL IN THE CROWN

Digital and Compaq in shock merger

In a deal valued at \$US9.6 billion dollars, Compaq has announced plans to acquire Digital Equipment Corporation, potentially creating a PC powerhouse that could rival IBM in size and scope.

The two companies have announced a definitive merger agreement, under which Digital will become a wholly owned subsidiary of Compaq. Details of how staffing levels will be affected and product lines merged were still being planned when APC went to press, but the deal is expected to be completed by the second quarter of this year.

Compaq sees the merger as helping it achieve its long-stated ambition of becoming one of the world's top three computer companies. It will be hoping that its volume strength in the PC market will combine with Digital's stronger brand-name recognition in the enterprise sector and well-developed servicing systems — areas in which Compaq has historically been weaker.

Gartner/Dataquest analyst Bruce McCabe said that there are pros and cons to the acquisition. "Size is very important, and once rationalised, it will help Compaq become more efficient. They have now fully supplemented their range."

At the same time, however,

What Compaq and Digital bring to the merger

Compaq

PLUSES

- Dominance of worldwide PC market
- Strong relationships with Microsoft
- Large cash reserves

MINUSES

- Lack of enterprise exposure
- Internal culture differs from Digital

Digital

PLUSES

- Established base of enterprise users
- Large service network

MINUSES

- Heavy product overlap in PCs and servers
- Poor financial performance in recent years

McCabe said Compaq is in danger of becoming too monolithic. If it spreads itself too thin, Compaq runs the risk of losing market dominance in particular segments, he said. It will be particularly difficult for it to maintain the top spot in the consumer segment, with Hewlett-Packard and Packard Bell just two of the companies competing heavily.

For clients, in the short term confusion will reign, said McCabe. It is hard to gauge how successful the merger will be until more information is released. "They need to release a road map of what will continue to be developed and what will be rationalised. And that will take a long time." It would be difficult to merge the two strong server lines, and also consolidate the two make-to-order plants already existing in

Australia. One of them would have to go, McCabe said.

It's important to take advantage of economies of scale, although this will be difficult and painful, if the earlier Tandem merger was any indication, said McCabe.

In Australia, Compaq is the top PC seller, with about 8% market share. Digital holds ninth position, with just under 4% of the market.

Rumours of an impending Digital buyout have been rife for some years, and increased in intensity last year when the company sold its Alpha chip manufacturing plants to Intel and its networking product business to Cabletron. The impact that the merger will have on those deals is not yet clear.

Angus Kidman and Selina Mitchell

Thailand proposes harsh Net law

Thai Net users have been fighting a proposed law to restrict information on the Net and control Internet service providers.

The first draft of the so-called 'Internet Promotion Act', apparently based on Singaporean legislation, sought to prohibit information on a whole range of subjects, from politics to sex services. This prompted a strong reaction in Thailand,

with an editorial in the *Bangkok Post* describing it as "the most restrictive law on communications in Thailand's history".

The Thai chapter of the Internet Society (ISOC-TH) is under fire for its involvement in drafting the legislation, and criticism has been made of its procedures. ISOC founder Vint Cerf expressed concern about the proposal in a letter to the *Bangkok Post*.

Even in its fourth draft, and after four

public hearings, the content and the drafting process of the bill are the subject of broad criticism.

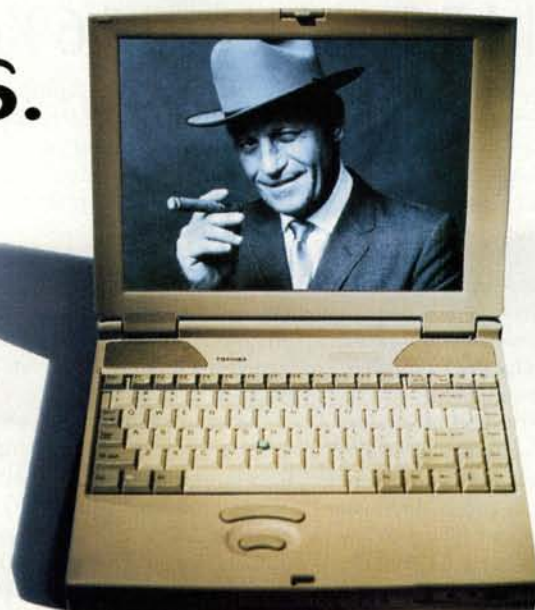
Critics are concerned not only about the potential for stifling freedom of speech and access to information, but also about the impact of such a law on the development of Thailand's economy. Exploiting educational and commercial uses of the Internet is seen as an important step in encouraging the increased deployment of IT, and ensuring Thailand has a place in the technologically advanced world.

Vanessa Richardson



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RHAPSODY, BEOS IN THE SPOTLIGHT

Alternative OSes show their wares

January's MacWorld Expo in San Francisco saw applications developers demonstrating new wares for Rhapsody and BeOS, proving that there is life in the non-Windows world yet.

A small number of early Rhapsody applications were on display at MacWorld Expo in San Francisco, and the new operating system remains on track for customer release by midyear. However, major ISVs are still shy about their plans.

An innovative spreadsheet called Mesa was demonstrated by long-time NextStep developer P&L Systems. Mesa harnesses the new operating system's power to manage real-time inputs such as newsfeeds and live database

updates, important requirements in exacting financial institution deployments. A number of major customers use Mesa on NeXT platforms, and the product is designed to coexist with Excel and Lotus 1-2-3. "Working with Excel is a necessity because we're not starting in a vacuum," P&L engineer Matt Ware told APC.

Omni Development displayed its OmniWeb browser and OmniPDF Acrobat viewer running on the Rhapsody developer release. OpenBase is a proven SQL database boasting strong integration with WebObjects, the Web application development

server inherited from Steve Jobs' company. OpenBase announced that it would now

show that it has signed a deal with Umax to distribute the advanced OS on Umax com-

puters in North America. Registered Be developers buying new Umax machines will be eligible for a free secondary processor upgrade from Umax, a sweetener designed to highlight the BeOS's multiprocessing strengths.

Unfortunately for local Be developers, the deal does not presently extend to the Taiwan-made Umax

clones sold in Australia. Be spokesperson Alex Osadzinski said the licensing agreement is global, so Umax will be able to include BeOS on the Taiwanese machines as it becomes ready.

A Mac OS emulator that allows Mac programs to run on top of BeOS was one of the more interesting products among the wares being shown by the half a dozen Be developers. Known as SheepShaver, the German project (pictured) is currently a research prototype.

Before its recent financial woes Netscape promised to port its FastTrack server to BeOS. In the meantime Purity Software is previewing a product called Charlotte, a Web server which implements HTTP 1.1 technologies.

Productivity software for the new platform is now emerging. Gobe Productive is a new suite with word processing, spreadsheet, charting, graphics and presentation functions.

Be Basics, a word-processing and spreadsheet package with similar features, was on display nearby.

Dan Tebbutt



waive run-time fees with free client software.

NeXT veteran Caffeine Software demonstrated how TIFFany3 image processing exploits the new platform's performance for executing publishing tasks; and Stone Design displayed Create, a page drawing and Web authoring application with a seven-year track record.

Prospective developers for the next-generation OS are well catered for. Metrowerks' CodeWarrior for Latitude offers an environment to port Mac applications to Rhapsody and Unix. Austria's AAA+ Software is offering a low-cost development tool called Joy to help programmers start exploring the Yellow Box environment on both PowerPC and Intel chips. And TipTop Software exhibited Objective-Everything, a scripting solution that supports Tcl, Perl and other scripting languages.

Similarly, doubts about the platform's viability were not enough to deter faithful BeOS developers from showing off their wares at MacWorld.

Be, the brainchild of former Apple mentor Jean-Louis Gassée, announced at the

THE BIG GET BIGGER

World PC sales up 16%

Suppressed demand in the Asia-Pacific region wasn't enough to slow down the worldwide market for PCs in 1997, which showed sales growth of 16% across the globe, according to research firm Dataquest.

Global sales exceeded 82 million units for the 1997 calendar year, but while the numbers were up, the number of vendors involved dropped dramatically. "Each quarter of 1997 witnessed the continuous consolidation of market presence by an elite few PC manufacturers," Bill Schaub, Dataquest vice-president, said in a statement. "During the course of 1997, the top four manufacturers captured almost 70% of PC unit growth worldwide, with Compaq seizing nearly 30% of that total expansion."

The big winners in the

global scene were Compaq, which shipped over 10 million units and experienced 42% growth on the previous year; Dell, which had a phenomenal growth rate of 62%; and Hewlett-Packard, which increased shipments by 55%. The top five companies globally were Compaq, IBM, Dell, Hewlett-Packard and NEC/Packard Bell.

Software sales are also growing, with preliminary IDC figures placing the value of the world software market at around \$US5.5 billion, with growth rates of 15.3% over the previous year. However, IDC warned that most of this growth came from additional purchases by existing software users, suggesting that the industry still has some ground to cover in attracting PC neophytes.

APC staff

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All's not well in the world of database software, with lacklustre sales and financial disasters spreading across the sector.

Database doldrums

When database specialist Sybase braced financial markets in January for a sales shortfall, industry doctors grew concerned. What started as a head cold inside Informix became a fever when Oracle disappointed screen-jockeys in December — and now a full respiratory infection is threatening to take hold.

Disarray inside the three main independent vendors is raising questions about the database market's growth capacity. The most alarmed diagnoses warn that demand is saturated, particularly among smaller businesses, which accounted for an uncharacteristically large proportion of recent sales.

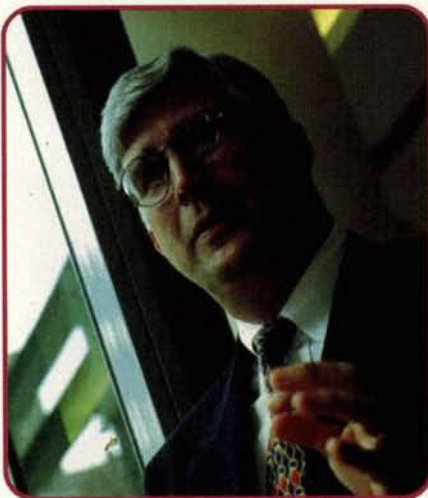
Vendors could have invited their own misery. Years of steep discounts and long-term deals encouraged enterprises to buy more database capacity than they needed, and now the market may be slowing down to take stock. Dataquest predicts new database licences will grow this year by only 11% to \$US8 billion, in contrast to the customary 30% to 40% increases of just a few years ago. Backing this forecast, new licence growth at Oracle — the sector's leading light with more than 25% market share — slowed from 65% in 1995 to just 8% during the first half of fiscal 1998.

Despite confessing some problems, Oracle tried to blame its sales woes on the then fledgling currency crisis in Asia. Markets adopted a more pessimistic view, dumping Oracle stock in record trading volumes and slashing the company's value by more than a third in one day.

Oracle faces trouble on a number of fronts. Oracle8, the upgrade launched in June, only generated single-figure sales increases over the previous year, just when analysts were clambering for major growth.

Meanwhile, CEO Larry Ellison appears enslaved by his network computer vision, a dalliance that's starting to mimic Oracle's new media folly of 1993-95. NC sales remain desperately thin on the ground, while projects such as the Sedona developer platform and InterOffice died painful public deaths. This apparent loss of focus has forced Oracle to open its cheque book and buy start-up companies or poach engineers to meet expectations.

Sybase attributed its underperform-



mance to sales-force issues, especially in North America. Currency issues undermined Asia, although the region (excluding Japan) only accounts for 10% of revenue.

Sybase's problems were underlined by the departure of regional managing director Alan Jervis (pictured) in early February, after the company failed to meet growth expectations in the Australian market.

Microsoft may be the biggest challenge for Sybase. The two companies developed SQL Server jointly but, after learning the ropes, Microsoft did not renew the alliance beyond the contract. These days Microsoft is flooding the database market with cut-throat pricing on SQL Server for NT.

The prototype of database debacles is undoubtedly Informix, a technological prodigy that hit the wall in 1997. A \$US140 million loss in Q1 started the trouble, but worse news followed when the company uncovered several years' worth of accounting errors where it improperly booked shipments to resellers as sales. Mismanagement threatened the company's very NASDAQ listing, but Informix survived a probationary phase and returned to regular trading — albeit at around 20% of its value a year ago.

Informix's problems were a simple matter of taking one's eye off the ball. It starting whipping up enthusiasm for advanced object-relational database technology and stopped promoting bread-

and-butter products. Sound, graphics and video server capabilities are sexy, but real-world deployments are beginning cautiously.

Demand for object-relational multimedia databases will approach \$US255 million by 2000, Dataquest forecasts, but in the meantime Informix is concentrating on a simplified product line centred on Dynamic Server. A new Web-oriented product called Data Director was launched before Christmas, providing potent project and content management capabilities for coordinating Web teams.

Technical prowess is still an Informix hallmark and its customers have been surprisingly loyal. "We are the vendor most willing to do whatever is required to earn your confidence, respect and business," new CEO Bob Finocchio wrote in an appeal to customers.

Headline sales in the database field may be slowing, but other underlying factors remain strong. Sophisticated applications that sit on top of a database infrastructure — such as prefab human resources software like SAP, PeopleSoft and Oracle Financials — are still selling well. Approximately one quarter of Oracle database sales come through SAP installations, which perhaps explains why Ellison's position is stronger than that of key rivals.

Sybase, however, is performing strongly in another growth area: data warehousing. Typical uses include divining trends from transactional data such as cash register records, with new opportunities expected to centre around Web site log file analysis.

Both SAP-style applications and data warehousing tend to treat the database as a mere platform on which to build more sophisticated functionality. Databases are becoming an invisible commodity, and the near-predatory pricing of offerings such as Microsoft SQL Server could force serious consolidation as the market matures.

Yet database market growth will not halt altogether. As Finocchio recently told one US newspaper: "Just as there will never be enough processing power, memory or storage, the market will always be able to use more database capacity."

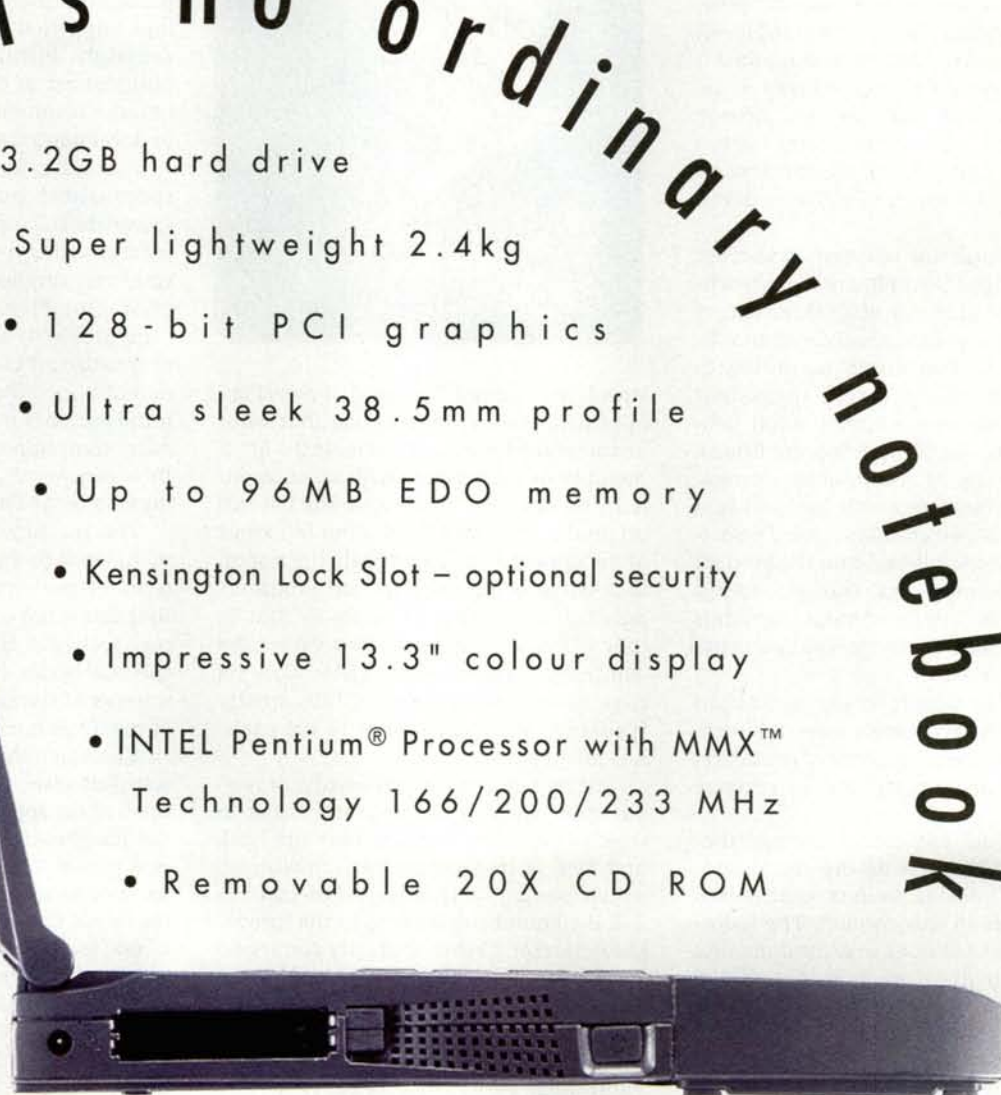
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A volley of suits and appeals illustrates the problems of trying to balance competition in software with intellectual property protection.

Flexing the copyright law

The long-running legal case between US firm Data Access Corporation and its former local distributor PowerFlex will go back to the courts some time this year, now that the High Court has decided it will hear an appeal by Data Access against a previous adverse finding. Whatever the ultimate outcome, the case has already demonstrated some of the complexities inherent in trying to apply concepts of copyright to the realm of software development.

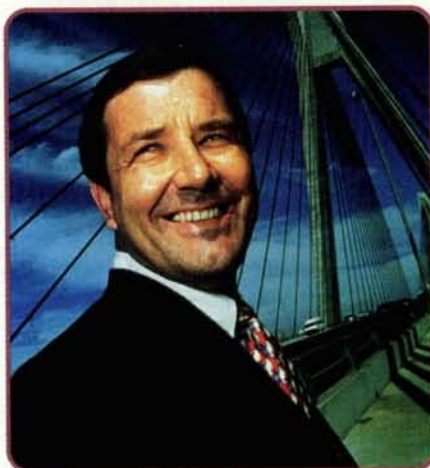
The original suit accused PowerFlex and its principal David Bennett of breaching copyright in the product DataFlex, of which it was the authorised distributor in Australia. The suit arose, according to Data Access Corporation president Charles Casanave (pictured), when Bennett suddenly stopped paying the licence fees for the use of the product, instead channelling the company's business to a product of his own creation, called PowerFlex. Data Access alleged that the product created by Bennett was transparently a copy of its own DataFlex product, and thus an infringement of the company's copyright in DataFlex.

Starting an action in the Australian courts was, in Casanave's view, the company's only recourse in terms of protecting its intellectual property and its revenue stream.

The original judgement deemed that discrete words (such as the commands used in the DataFlex product) were indeed copyrightable in this context. The judgement appeared at odds with fundamental principles in the Copyright Act, which state that it is the form in which ideas are expressed, not the ideas themselves, which are protected.

Casanave welcomed the original judgement, saying that it provided a level of certainty which was essential in an environment in which developers might invest thousands of hours in "an expensive and creative process", but recognised that it also posed something of a quandary for software developers that wanted to replicate some of the functionality of existing software products without infringing on intellectual property rights.

However, the judgement was not to



stand untouched for long. PowerFlex appealed, seeking to establish that what Bennett had done was to recreate the functionality of the product without substantially reproducing the form in which it was originally expressed. In finding in favour of the appeal, the court upheld the notion that while commands in two programs may have the same meaning — that is, they will cause the same effect within the computer system — the instruction set may be entirely different. Thus, strictly speaking, no infringement of copyright has taken place.

The appeal used as precedent a drawn-out case between Borland and Lotus in which Lotus sued Borland over the 'look and feel' of its Quattro Pro spreadsheet, which was arguably modelled on Lotus 1-2-3, the figurehead offering in the spreadsheet market. "What that case confirmed was Borland's right to tell its potential customer base 'If you are a 1-2-3 user, then here's an interface you could feel comfortable using'," intellectual property lawyer Philip Argy explained. "What PowerFlex has done, to all intents and purpose, is the same thing: saying to its current customer base, which is DataFlex users, 'Here's a product which offers the same functionality, but it costs less'."

This judgement redressed what many regarded as a flaw in the application of the strict guidelines of the law, but muddied the waters surrounding what had actually happened. "Reverse engineering, which we define as carefully watching and

using something to discover how it works, is perfectly legitimate," Bennett said following the appeal finding.

Argy pointed out, however, that the judgement merely reinforced that what had happened was not deemed to be a copyright infringement in the strictest application of the act, and offered no broader comment on PowerFlex's actions in developing the software.

Casanave, for his part, denies that the spreadsheet parallel is accurate. "A spreadsheet is a metaphor for dealing with information, and Lotus, Borland, CA, whoever, implemented the same metaphor. DataFlex, however, in my view, compares with something like Cobol. It's proprietary, it's not out there in the public domain . . . There's no question in my mind that they ever had anything in mind other than appropriating our product. In their own words, they say they have produced a *better DataFlex than DataFlex*".

The message that the appeal judgement sends to the outside world, he said, is a dangerous one. "What it says to me is that this is not a place I would make serious software investments, since I am assured under this judgement that any number of companies would have free use of my investment."

Casanave will now have the chance to test that view, since the High Court has allowed an appeal by Data Access against the judgement. "What the court decided was purely that the action by PowerFlex was not an infringement of copyright, but that's not the same thing as saying there is not nor should be any protection for companies such as Data Access," Argy said. "Neither should we infer that Data Access had no other legal remedies. Perhaps copyright is not the one it should have sought."

But the fact that leave has been granted to appeal to the High Court endorses the view that software copyright is too important an issue to leave with so many shades of grey. "The High Court very rarely gives leave to appeal, and the fact that it has done so recognises that the case raises, and hasn't yet settled, very important principles in Australian law," said Argy.

Helen Dancer



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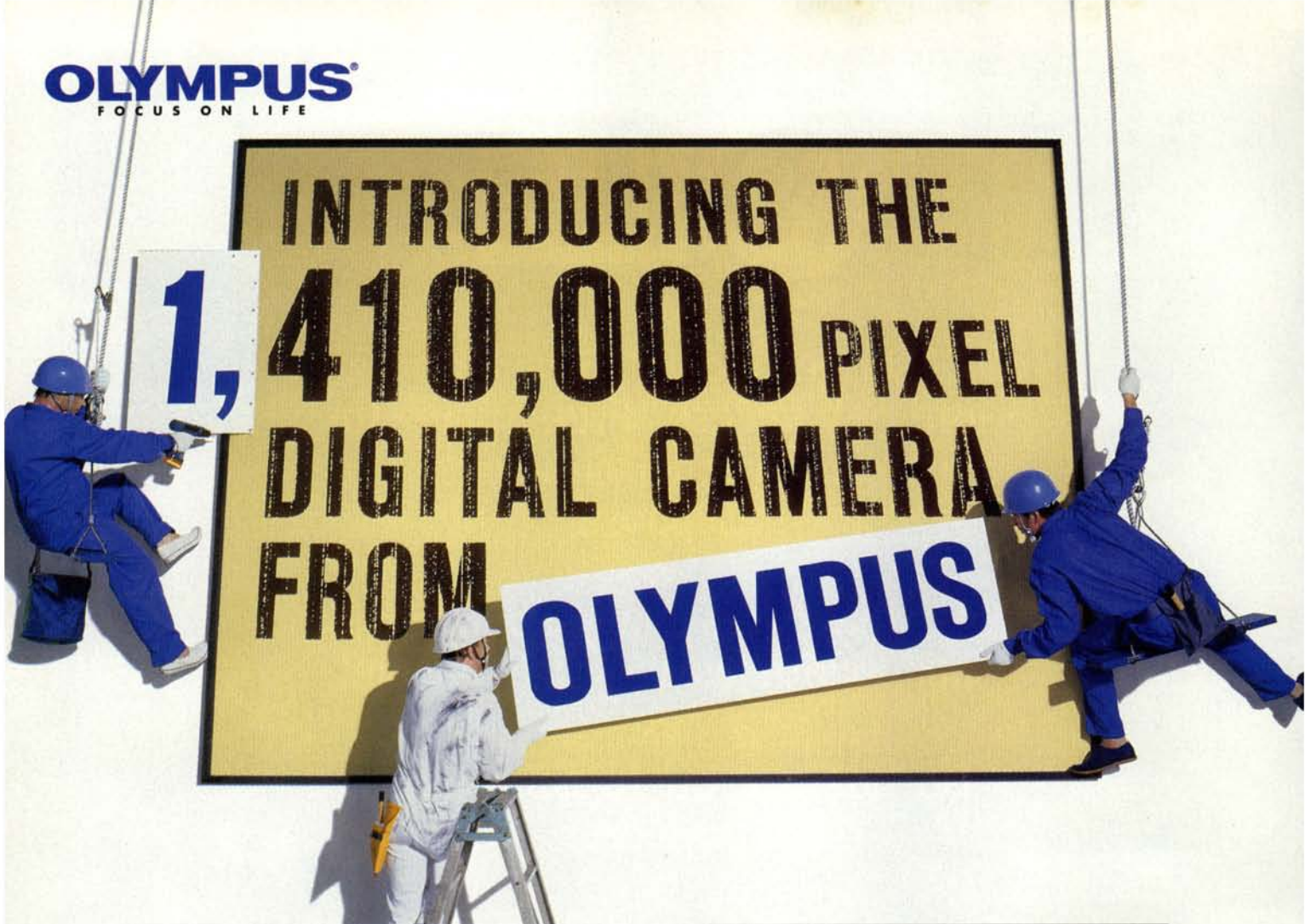
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Gateway and Dell 333MHz desktops

As has become standard practice, Intel announced the release of its latest and greatest chip after machines using the processor arrived in APC Labs. Code-named Deschutes, the Intel 333MHz Pentium II processor for desktop computers is the first Pentium II processor built on Intel's advanced 0.25-micron processing technology. Intel is promoting the processor as providing enough processing power to meet the 'visual computing' requirements of the Internet age. Accordingly, the 333MHz machines being supplied by vendors have a large number of multimedia extras installed, appealing to the power-hungry user with a relatively substantial bank balance.

The first Deschutes processor-based machines tested by APC, from Gateway and Dell, were impressive, both in performance and features. While prices are expectedly high for the new reigning Intel chip, many extras have been supplied with the machines to tempt users into purchasing a system that will soon be overtaken by machines installed with a 350MHz Pentium II chip.

The two systems tested are based on the 66MHz bus — the next Deschutes processors will use a 100MHz bus and run at 350MHz. Machines using this processor should be available by April, although Intel had not set an official release date at the time of going to press.

The specifications of the two machines were very similar, the major difference being the whopping 19in monitor supplied

on the Gateway's G6-333XL, compared to the 15in monitor supplied with the Dell XPS Dimension D333. At \$5,899, the Gateway system is marginally cheaper



than the Dell, which is priced at \$5,999. While both machines performed well in our tests, the G6-333XL was just ahead of the Dimension D333 in most instances.

The 333MHz processor machines, with their 512K L2 integrated cache, achieved impressive Business and High-End Winstone 97 scores. The Dell managed scores of 58.03 and 31.53 respectively, with the Gateway achieving the slightly higher scores of 59.43 and 32.5.

Again, in CPUMark32 tests the Gateway came out in front, with its score of 840.67 comparing well to the Dell's score of 807.67. It also came out slightly ahead in High-End Disk WinMark 97 tests with a score of 4,406.67, compared to 4,350. The Dell achieved better results in the Business Disk WinMark 97 benchmarks, beating the Gateway by 36.67 with a score of 1,300. In the graphics tests, however, the Gateway again came first. It scored 146 and 63.97 in the Business and High-End Graphics WinMark 97 tests; while the Dell scored 137.33 and 60.57, respectively.

Both of the tower-design systems included 64M of SDRAM; a DVD-ROM drive; an Iomega Zip drive; a set of three

speakers (Altec Lansing with the Dell and Boston Acoustic Media with the Gateway); a soundcard; US Robotics 33.6Kbps modem; USB support; 4M AGP graphics card (an STB Velocity 128 card with the Dell and an nVidia card with the Gateway); and Microsoft Windows 95 and Office 97. Both systems also use an 8.4G hard disk drive.

The Gateway bundles in a software choice of Microsoft Generations or the Australian Education Pack. Dell includes Microsoft Home Essentials, Microsoft Office Pro and McAfee VirusScan.

Gateway offers a three-year warranty on all parts, as well as a one-year discretionary onsite warranty, which depends on the nature of the user and the type of part that is faulty. Lifetime hotline support is also available. Dell provides a three-year parts and labour warranty, with the first year onsite.

Both machines offer many impressive features and strong performance. The Gateway achieved slightly better results in our WinBench tests, and it also has the advantage of a larger monitor, and a slightly cheaper price.

Selina Mitchell

Benchtest results

	Dell	Gateway
Business Winstone 97	58.03	59.43
High-End Winstone 97	31.53	32.50
Business Disk WinMark 97	1,300	1,263.33
High-End Disk WinMark 97	4,350	4,406.67
Business Graphics WinMark 97	137.33	146.00
High-End Graphics WinMark 97	60.57	63.97
CPUMark32	807.67	840.67
CD-ROM WinMark 97	985	1,330

Gateway G6-333XL

■ Distributor	Gateway 2000
■ Phone	1800 061 315
■ Online	http://www.gw2k.com.au
■ Price	\$5,899
■ In short	A solid performance machine with plenty of extras for its price.

Dell XPS Dimension D333

■ Distributor	Dell
■ Phone	1800 810 287
■ Online	http://www.dell.com.au
■ Price	\$5,999
■ In short	A feature-packed system that performs well.

At last, the vision of Java applications is realised.

Lotus eSuite WorkPlace

As an office suite written in Java and designed to run on a server, Lotus' eSuite WorkPlace (developed under the code-name 'Kona') is both a huge leap forward and a step back in time.

Since it is written in a platform-independent programming language, it can theoretically run on any Java Virtual Machine (JVM) and be modified to suit an organisation's needs. However, as it runs from a server to meet the needs of thin clients, mainframe-style, it is a cut-down package without the power of today's leading productivity apps. But it's a refreshing new style of software, and definitely worth a close look if you have faith in thin clients and an intranet/Internet future.

The WorkPlace interface feels like a cross between a modern Web browser and a lightweight Lotus Notes. It looks very attractive, with bright, friendly icons and slick menu design — a great advance for Java apps, which have often looked dull. It didn't run fast, even on our test-bed Pentium Pro 200, but worked at a reasonable speed for all but the most complex operations. The long load times we experienced will probably only really be solved with the advent of dedicated Java chips which natively interpret Java bytecode.

On startup, the user logs in and sees the main eSuite screen of icons, similar to the Notes workspace. The icons shown depend on the capabilities assigned to the user by the server administrator, drawn from the basic set of eSuite applets (email, word processor, spreadsheet, presentation graphics, calendar/address book and Web browser) and third party add-ons. Returning to recent documents is easy with the 'Work Files' icon, while a vertical taskbar runs down the left-hand side for easy switching between open applets. The taskbar can be minimised, assigning screen space to work in progress.

Each applet has a similar interface, with menus at the bottom of the screen. These include standard file and formatting menus, with a few functions specific to the applet's purpose.

The basic email applet supports POP and LDAP mail servers, with all the regular mail-client features such as reply-to-all and forward, but lacks the convenience of complex features such as filtering.

Similarly, the eSuite word processor does not come with advanced features such as mail merge, but it does have strong formatting and layout features. A selection of clip art is included for use across all apps. Word processor documents are saved as either HTML or text.



This is truly open and cross-platform, but perhaps a little too revolutionary if you need to share formatted documents with users of other word processors.

The spreadsheet applet has the feel of a lightweight 1-2-3 and is powerful enough to cope with company accounting and everyday business work, but is not for rocket scientists. The same goes for the presentation software, calendar and address book — all are attractive little apps, but power users will feel restricted. Then again, these applets are not designed for the power user; they are aimed at a world where 80% of users only ever touch 20% of a program's capabilities.

For the moment, Lotus has incorporated Sun's HotJava as its Web browser — a good example of how administrators should be able to plug in third-party Java apps. And as the other half of the eSuite project is the upcoming eSuite DevPack, inhouse customisation will also be possible.

HotJava as a browser is fine and can cope with most HTML, though it balks at some of the most modern layout techniques available to Netscape and IE4. Of course, a Java-based browser is quite at home running Java applets downloaded from the Web, but it would not download other files — a blessing for system administrators who

do not want their users polluting thin-client machines with alien software.

The administrator is provided with a customisation tool set (WorkPlace Administrator), which is a little baffling at first (elements to modify have names like 'messageSourceMgr'), but it allows simplification or extension of each user's eSuite environment. For example, it is possible to set up access to legacy applications using an eSuite terminal applet.

The 'pilot demonstration release' reviewed was quite solid, but did not yet have an installation program, so icons with environment settings had to be created manually. A few minor capabilities were also missing (or acknowledged as unstable). A Pentium 133 was recommended for adequate operation, and only a limited range of graphics cards was supported. Occasional

crashes occurred when intensive operations were done one after the other, requiring the JVM and application to be restarted (the demonstration release came with its own JVM and ran under Windows 95, with server activity shown in DOS boxes). And while it is platform-independent, eSuite is still OS-reliant for external tasks such as printing.

Despite the demonstration release glitches, using the Workplace environment was productive and the lack of frills was refreshing. Though it follows the familiar suite concept and lacks speed on traditional PCs, eSuite is something new. It takes several leaps towards fulfilling Java's promises — network administrators should look closely.

Simon Vandore

Lotus eSuite WorkPlace

■ Distributor	Lotus Development
■ Phone	1800 252 408
■ Online	http://www.esuite.lotus.com
■ Price	Approximately \$69 per user
■ In short	A light, revolutionary, cross-platform office suite, ready to succeed in the thin-client market — if it's not ahead of its time.

**It's hard to improve
Hansol's picture quality.
But we've made it easy to try.**



If you're looking for great picture quality, picture this. An advanced 17" (15.7" viewable) monitor with a .26mm dot pitch, 1,600X1,280 resolution, and a truly flicker-free refresh rate. All housed in a radical, modern design as cutting edge as the technology itself. It's a hard to beat picture. But trying couldn't be simpler. Because the 700 P features a drop down panel that easily and completely controls the entire system with 20 on-screen setting including colour, brightness, contrast, size, position and more. Not to mention a zoom-in that will knock you out. So if

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Dell Inspiron 3000 M266XT and Gateway 2000 Solo 9100XL



While some vendors are deciding whether to implement Intel's Pentium 266MMX

processor in their notebooks, or to wait until the new Pentium II hits the market later this year, Dell and Gateway 2000 have moved quickly to get a product on the shelves.

Both the Dell Inspiron 3000 M266XT and Gateway Solo 9100XL sport Intel's 266MHz MMX processor with 64M of RAM. While they share a number of similarities, there are also enough differences to clearly distinguish the merits of each notebook.

The first immediate difference is the odd \$1,500 in price. While the Dell machine comes in at \$6,539, Gateway's offering has a much higher price of \$7,999. Is the Gateway Solo worth the extra money?

Its most significant feature is its 14.1in active matrix TFT display, compared to Inspiron's 13.3in unit. However, size isn't everything. We found the Inspiron screen much more pleasant to look at, with sharper, better defined text and colours.

Gateway packs a larger hard drive in its Solo machine (5G) compared to the Inspiron (4G), and in this case, the larger drive returned better Disk WinMark results under our testing conditions (see our test results below).

If battery life is your chief priority, then the Solo's four hours and 30 minutes result will certainly impress. (This easily bettered

the previous record of four hours and 10 minutes, held by an earlier model Gateway Solo 9100XL notebook).

The Inspiron's result of three hours and 10 minutes was also very good but still well over an hour behind its competitor. It is interesting to note that while the Solo's battery required four hours to fully recharge, the Inspiron was

ready to go after just two hours of recharging.

Both notebooks use lithium ion batteries.

On the testing front, the units ran neck and neck in most tests. The exception was the Business Disk WinMark 97, where the Solo outdid the Inspiron by a considerable margin. The Inspiron, however, fought back with stronger Graphics WinMark 97 results. Expect even better notebook performance with the Pentium II.

The Inspiron is relatively thin and light compared to the Solo, but keep in mind that the latter has a larger screen, which partly accounts for the extra kilo in baggage. Unlike the Solo machine, which has a combined CD-ROM drive and floppy unit, the Inspiron has a swappable floppy/CD-ROM drive; however, the floppy can be attached externally via a cable. The Solo features a 20x CD-ROM drive and 33.6Kbps modem, while the Inspiron goes one better with a 24x drive and a 56Kbps modem.

The layout of both units is similar. Each has a Windows 95 keyboard with a glide pad below, and plenty of wrist space on either side of this navigational device. We found the Inspiron's glide pad easy to control, but the Solo's was a little too sensitive for our liking. Both keyboards were comfortable to type on and we appreciated the Solo's large, easy-to-hit backspace key. However, we cursed

Dell's tiny excuse for a backspace button. Each notebook also featured similar ports, including infra-red and USB ports. The Solo also had composite video-in and video-out ports (for display to a TV screen). Gateway offers a three-year warranty with its notebook while Dell offers only one year.

Our conclusion? While the price difference seems significant at first, Gateway 2000's Solo 9100XL offers some significant features and good performance levels which easily justify its initial purchase price.

Roulla Yiaccoumi



Dell Inspiron 3000 M266XT

■ Distributor	Dell
■ Phone	1800 810 287
■ Online	http://www.dell.com.au
■ Price	\$6,539
■ In short	A sturdy, well-performing and relatively inexpensive notebook.

Benchtest results

	Dell	Gateway
Business Winstone 97	45.1	45.2
High-end Winstone 97	23	22.3
Business Disk WinMark 97	827	951.7
High-end Disk WinMark 97	2,706.7	3,080
Business Graphics WinMark 97	84.2	74.9
High-end Graphics Winmark 97	39.67	36
CPUMark32	487.3	464
CD-ROM WinMark 97	835	1090
Battery (hours:minutes)	3:09	4:30

Gateway Solo 9100XL

■ Distributor	Gateway 2000
■ Phone	1800 061 315
■ Online	http://www.gw2k.com.au
■ Price	\$7,999
■ In short	A large-screen, chunky notebook with great battery power.

The one show you
can't afford to miss.



"You've got a friend in the business."®

We'll bring your work to life



At Gateway 2000 we'll build your portable with the very latest technology. That means 14.1" screens, SDRAM memory, low voltage processors that extend battery life and 128-bit video cards.

Modularity

What really makes our portables stand out is their modular design.

Besides removable hard drives, we use interchangeable floppy and CD ROM

drives for increased functionality. And while these are undoubtedly big advantages, the real key to a successful modular design lies in the circuit board: at Gateway we use the Intel IMM architecture so that we can update to the latest processors as they become available.

Interchangeability

We take things that little bit further by focussing on interchangeability. Our range of portables is designed to share as many components as possible (including hard drives, adaptors, batteries etc), which means

that IT managers and users alike are assured of real peace of mind for the future.

Flexibility

To give you the last word in flexibility, all Gateway portables have the option of Docking and Mini Docking Stations. Both feature expansion slots and ports that let you connect your Solo portable to a wide range of peripherals.

Gateway's Solo™ 2300



Gateway's Solo™ 9100XL

At the top-of-the-line, our multi award-winning Solo 9100XL is a real desktop-replacement system. Featuring an Intel 266MHz Pentium® Processor with MMX™ Technology, 5GB hard drive and a 14.1" screen that displays 65,000 colours, this portable will really keep you ahead of the pack.

Gateway's Solo™ 2300

Solo 2300 Series portables come with your choice of processor from Intel, from the 166MHz Pentium® processor with MMX™ Technology right up to the awesome 233MHz version. Your computer can be as individual as you. And to keep your future options open, all models can expand to a massive 192MB of RAM.



Mini Docking Station



Gateway's Solo™ 9100XL

So there we have it: technology, modularity, interchangeability, flexibility and value. A simple summary of how Gateway has turned its portables into an art form.

Good enough to frame

All Gateway G-Series desktop and tower systems feature Intel Pentium® II or Intel Pentium® processors with MMX™ Technology, which means you'll get the processing power that today's applications demand. Our Pentium® II Processor-based systems use the Intel 440LX chipset and as a result, benefit from the latest technologies: Ultra ATA disk drives, AGP Graphics processors and SDRAM memory.

Gateway's G-Series

Our G-Series computers are packed with all the hardware goodies you'd expect. So you'll be able to use the latest business software, play the latest games and access the latest multimedia education packages to help the kids with their schoolwork.

The Gateway G6-233 is a fully configured multi-media PC complete with the latest from Intel – the Intel Pentium® II Processor. For \$2999 it's most definitely a masterpiece.

Gateway's GP-Series

Gateway GP computers are perfect for small and home offices, and have been optimised to deliver power

and flexibility. This guarantees you the grunt you need now, together with the upgradeability that will keep you at peak performance in the future.

To help you decide which model is for you, check out the specs on the back page, and let us know if you'd like to make any changes! Our build to order business model allows you to choose which components you'd like and we'll build a system just for you.



G6-233

A broader canvas

When it comes to how fast you work, processor speed isn't the only consideration: a larger monitor can dramatically improve your productivity. What's more, it can make your day more enjoyable and improve your personal comfort.

Our EV900 19" monitor gives you increased viewing area, without taking up any more desk space than a 17" monitor.

Optional software packs available with Gateway's G-Series computers.

Package A: Microsoft Generations Software

- MS Works
- MS Encarta '97
- MS Julia Childs Home Cooking
- MS Music Central '97
- MS Wine Guide
- MS Money 5.0
- MS Cinemania '97

Package B: Games Pack

- Bug !
- Sega Rally Championship
- Deadlock
- 3D Ultra Pinball
- Greg Norman Ultimate Challenge Golf
- Mech Warrior 2

Package C: Australian Educational Pack

- Webster's Australian Encyclopedia '97
- Webster's Holidaying in the Pacific
- Webster's Great Barrier Reef
- Explore Australia 1997
- Webster's Fishing Australia
- Ron & Valerie Taylor's Sharks
- Trev to the Rescue
- TELEROM



The New Masters

Like the world's great artists, we enjoy creating masterpieces. Just take a look at our latest collection.

State of the art

Introducing the Solo 9100XL. This top-of-the-range portable sets a new speed record with its 266MHz Pentium® Processor with MMX™ Technology, delivering substantial improvements in performance. New state-of-the-art technology means that the CPU uses 42% less power than earlier models, even when running at maximum speed, which means battery life is extended to being one of the longest in the industry.

Digital future

DVD (Digital Versatile Disk) will give you improved storage, great performance and incredible



**DVD
Drive**

versatility and compatability. Each disk has seven times the capacity of a single compact disk and can store digital

quality movies with sound tracks in several different languages. As well as the new disks, a DVD Drive will also play existing audio CD's and CD ROM's.



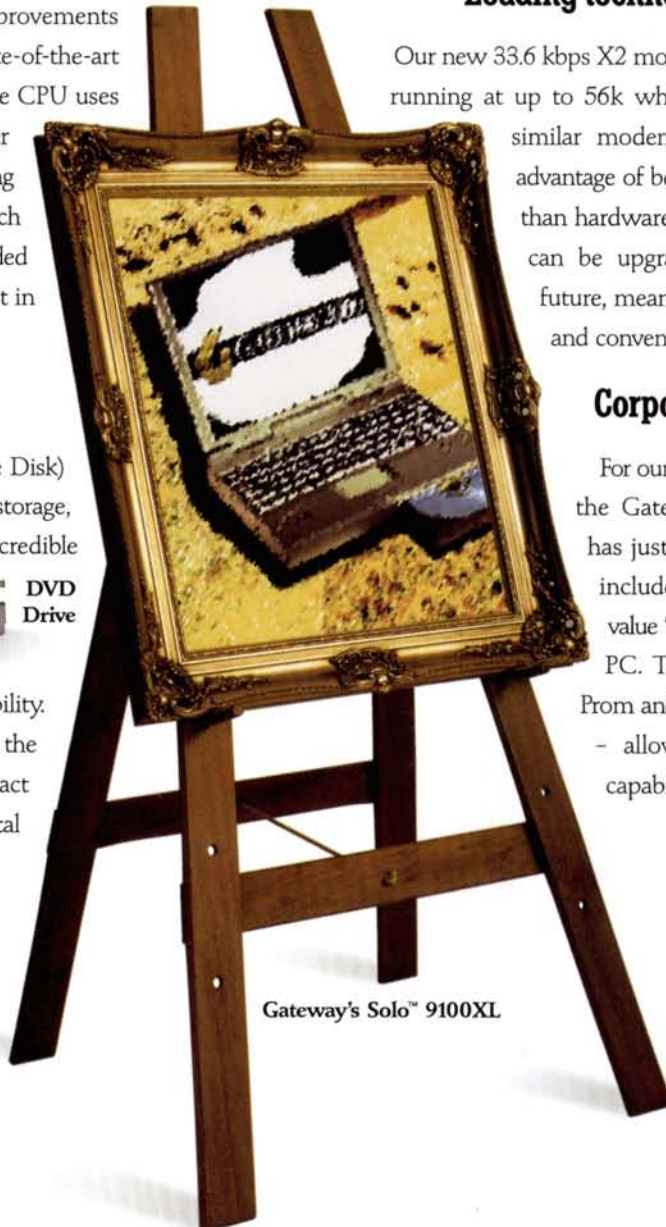
**X2 technology
modem**

Leading technology

Our new 33.6 kbps X2 modems are capable of running at up to 56k when connected to a similar modem. They have the advantage of being software rather than hardware controlled, and so can be upgraded easily in the future, meaning more flexibility and convenience for you.

Corporate update

For our business customers, the Gateway E-1000 series has just been expanded to include a low cost, high value "diskless" networked PC. This PC has a Boot Prom and no hard disk drive - allowing remote boot capabilities.



Gateway's Solo™ 9100XL



Gateway GP-Series Professional PCs

GP5-200SE

- Intel 200MHz Pentium® Processor with MMX™ Technology
- 32MB SDRAM Memory
- 512K Pipelined Burst Cache
- 2.0GB Ultra ATA Hard Drive
- 144MB 3.5" Diskette Drive
- 2MB ATI SGRAM 3D Graphics Accelerator
- 15" Colour Monitor
- Min 13x/Max 32x CD-ROM Drive
- Desktop Case
- 104-Key Windows 95 Keyboard
- Microsoft® Mouse
- Microsoft Windows 95
- Microsoft Works

\$1999 inc. tax or \$18 p/w*

GP6-233

- Intel 233MHz Pentium® II Processor
- 32MB SDRAM Memory
- 512K L2 Integrated Cache
- 2.0GB Ultra ATA Hard Drive
- 144MB 3.5" Diskette Drive
- 4MB nVidia AGP Graphics
- 15" Colour Monitor
- Min 13x/Max 32x CD-ROM Drive
- Midtower Case
- 104-Key Windows 95 Keyboard
- Microsoft Intellimouse
- Microsoft Windows 95
- MS Office 97, Small Business Edition+

\$2599 inc. tax or \$23 p/w*

GP6-266

- Intel 266MHz Pentium® II Processor
- 32MB SDRAM Memory
- 512K L2 Integrated Cache
- 4.0GB Ultra ATA Hard Drive
- 144MB 3.5" Diskette Drive
- 4MB nVidia AGP Graphics
- 15" Colour Monitor
- Min 13x/Max 32x CD-ROM Drive
- Midtower Case
- 104-Key Windows 95 Keyboard
- Microsoft Intellimouse
- Microsoft Windows 95
- MS Office 97, Small Business Edition+

\$2899 inc. tax or \$25 p/w*

GP6-333

- Intel 333MHz Pentium® II Processor
- 64MB SDRAM Memory
- 512K L2 Integrated Cache
- 6.4GB Ultra ATA Hard Drive
- 144MB 3.5" Diskette Drive
- 4MB nVidia AGP Graphics
- 17" Colour Monitor
- Min 13x/Max 32x CD-ROM Drive
- Midtower Case
- 104-Key Windows 95 Keyboard
- Microsoft Intellimouse
- Microsoft Windows 95
- MS Office 97, Small Business Edition+

\$4199 inc. tax or \$36 p/w*

GP6-300 Intel 300MHz Pentium II Processor, 32MB SDRAM, 4.0GB Hard Drive

\$3599 inc. tax or \$31 p/w*

Gateway G-Series Multimedia PCs

G5-200

- Intel 200MHz Pentium® Processor with MMX™ Technology
- 32MB SDRAM Memory
- 512K Pipelined Burst Cache
- 2.0GB Ultra ATA Hard Drive
- 144MB 3.5" Diskette Drive
- 2MB ATI SGRAM 3D Graphics Accelerator
- 15" Colour Monitor
- Min 13x/Max 32x CD-ROM Drive
- Ensoniq WaveTable Audio
- Altec® Lansing Performance Amplified Speakers
- Desktop Case
- 104-Key Windows 95 Keyboard
- Microsoft Intellimouse
- x2 Technology 56 K/bits Data/Fax/Voice Modem and Speakerphone
- Telstra Big Pond Internet Kit with 50 hours free access*
- Microsoft Windows 95
- MS Office 97, Small Business Edition+

\$2299 inc. tax or \$20 p/w*

G5-233 Intel 233MHz Pentium® Processor with MMX™ Technology

\$2499 inc. tax or \$22 p/w*

G6-233

- Intel 233MHz Pentium® II Processor
- 32MB SDRAM Memory
- 512K L2 Integrated Cache
- 4.0GB Ultra ATA Hard Drive
- 144MB 3.5" Diskette Drive
- 4MB nVidia AGP Graphics
- 15" Colour Monitor
- Min 13x/Max 32x CD-ROM Drive
- Ensoniq WaveTable Audio
- Altec® Lansing Performance Amplified Speakers
- Midtower Case
- 104-Key Windows 95 Keyboard
- Microsoft Intellimouse
- x2 Technology 56 K/bits Data/Fax/Voice Modem and Speakerphone
- Telstra Big Pond Internet Kit with 50 hours free access*
- Microsoft Windows 95
- Microsoft Office 97, Small Business Edition+

\$2899 inc. tax or \$25 p/w*

G6-266

- Intel 266MHz Pentium® II Processor
- 32MB SDRAM Memory
- 512K L2 Integrated Cache
- 4.0GB Ultra ATA Hard Drive
- 144MB 3.5" Diskette Drive
- 4MB nVidia AGP Graphics
- 17" Colour Monitor
- Min 13x/Max 32x CD-ROM Drive
- Ensoniq WaveTable Audio
- Altec® Lansing Performance Amplified Speakers
- Midtower Case
- 104-Key Windows 95 Keyboard
- Microsoft Intellimouse
- x2 Technology 56 K/bits Data/Fax/Voice Modem and Speakerphone
- Telstra Big Pond Internet Kit with 50 hours free access*
- Microsoft Windows 95
- Microsoft Office 97, Small Business Edition+

\$3499 inc. tax or \$30 p/w*

G6-300 Intel 300MHz Pentium II Processor, 64MB SDRAM, 6.4GB Hard Drive, Boston Acoustic Speakers

\$4299 inc. tax or \$37 p/w*

G6-333XL

- Intel 333MHz Pentium® II Processor
- 64MB SDRAM Memory
- 512K L2 Integrated Cache
- 8.4GB Ultra ATA Hard Drive
- 144MB 3.5" Diskette Drive
- 4MB nVidia AGP Graphics
- 19" Colour Monitor
- DVD-ROM Drive
- Ensoniq WaveTable Audio
- Boston Acoustic Media Theatre Speakers
- Tower Case
- 104-Key Windows 95 Keyboard
- Microsoft Intellimouse
- Zip Drive and 100MB Zip Disk
- x2 Technology 56 K/bits Data/Fax/Voice Modem and Speakerphone
- Telstra Big Pond Internet Kit with 50 hours free access*
- Microsoft Windows 95
- Gateway Select Software Pack
- Microsoft Office 97, Small Business Edition+

\$5699 inc. tax or \$48 p/w*

Gateway Solo Portable PCs

2300

- Intel 166MHz Pentium® Processor with MMX™ Technology
- 12.1" DSTN Passive Matrix Colour Display
- 16MB SDRAM (expandable to 192MB)
- 256K Pipelined Burst Cache
- 128 Bit 2MB Neomagic Video Accelerator
- 14GB Removable Hard Drive
- Modular 144MB 3.5" Diskette Drive
- Integrated Yamaha 16-Bit Sound with Stereo Speakers
- PCMCIA Slots - 2 Type II or 1 Type III
- NiMH Battery Pack & AC Pack
- 85-Key MS Windows 95 Keypad
- EZ Pad Pointing Device
- Built-in Mic & Line-In Jacks
- Parallel, Serial, fast Infrared, PS/2, ext. Video and USB ports
- Card Bus
- Casual Carry Case
- Microsoft Windows 95

\$2999 inc. tax or \$26 p/w*

2300LS Intel 200MHz Pentium® Processor with MMX™ Technology, 12.1" Active Display, 32MB SDRAM, 512K Cache, 21GB Hard Drive, 8/20 Speed CD-ROM, 12 Cell Lithium-Ion Battery, MS Office 97, SBE+

\$4299 inc. tax or \$37 p/w*

2300XL

- Intel 233MHz Pentium® Processor with MMX™ Technology
- 13.3" VGA Active Matrix Colour Display
- 32MB SDRAM (expandable to 192MB)
- 512K Pipelined Burst Cache
- 128 Bit 2MB Neomagic Video Accelerator
- 3.1GB Removable Hard Drive
- Modular 144MB 3.5" Diskette Drive
- Modular 8/20 Speed CD-ROM Drive
- Integrated Yamaha 16-Bit Sound with Stereo Speakers
- 33.6 K/bits Fax modem and Software
- Telstra Big Pond Internet Kit - with 50 hours of free access*
- PCMCIA Slots - 2 Type II or 1 Type III
- 12 Cell Lithium-Ion Battery Pack & AC Pack
- 85-Key MS Windows 95 Keypad
- EZ Pad Pointing Device
- Built-in Mic & Line-In Jacks
- Parallel, Serial, fast Infrared, PS/2, ext. Video and USB ports
- Card Bus
- Casual Carry Case
- Microsoft Windows 95
- Microsoft Office 97, Small Business Edition+

\$5499 inc. tax or \$46 p/w*

5100

- Intel 200MHz Pentium® Processor with MMX™ Technology
- 14.1" XGA Active Matrix Colour Display
- 32MB SDRAM (expandable to 144MB)
- 512K Pipelined Burst Cache
- 2MB EDO VRAM
- 21GB Removable Hard Drive
- Modular 144MB 3.5" Diskette Drive
- Modular 8/20 Speed CD-ROM Drive
- Integrated 16-Bit SoundBlaster PRO Sound with Stereo Speakers
- PCMCIA Slots - 2 Type II or 1 Type III
- 9 Cell Lithium-Ion Battery Pack & AC Pack
- 88-Key MS Windows 95 Keypad
- EZ Pad Plus® Pointing Device
- Built-in Mic & Line-In Jacks
- Parallel, Serial, fast Infrared, PS/2, ext. Video and USB ports
- Card Bus
- Casual Carry Case
- Microsoft Windows 95
- Microsoft Office 97, Small Business Edition+

\$5499 inc. tax or \$46 p/w*

Solo 5100LS Intel 233MHz Pentium® Processor with MMX™ Technology, 64MB SDRAM, 3.1GB Hard Drive, 33.6K/bits modem & 50hrs Free Internet Access, Deluxe Carry Case

\$6499 inc. tax or \$55 p/w*

9100XL

- Intel 266MHz Pentium® Processor with MMX™ Technology
- 14.1" XGA Active Matrix Colour Display
- 64MB SDRAM (expandable to 192MB)
- 512K Pipelined Burst Cache
- 4MB EDO VRAM
- 50GB Removable Hard Drive
- Modular Combo min 8X/max 20X CD-ROM Drive and 144MB 3.5" Diskette Drive
- Integrated Yamaha 16-Bit Sound with Stereo Speakers
- 33.6K/bits Fax Modem and Software
- Telstra Big Pond Internet Kit - with 50 hours of free access*
- PCMCIA Slots - 2 Type II or 1 Type III
- 12 Cell Lithium-Ion Battery Pack & AC Pack
- 88-Key MS Windows 95 Keypad
- EZ Pad Pointing Device
- Built-in Mic & Line-In Jacks
- Parallel, Serial, fast Infrared, PS/2, ext. Video and USB, PAL in/out, 15 pin game and Midi ports
- Deluxe Carry Case
- Microsoft Windows 95
- Microsoft Office 97, Small Business Edition+

\$7599 inc. tax or \$65 p/w*

Solo 9100 - Intel 233MHz Pentium® processor with MMX™ Technology, 32MB SDRAM, 4.0GB Hard Drive, Casual Carrying Case

\$6599 inc. tax or \$57 p/w*

Our Sales hotline is open
Mon - Fri 9 am to 5.30 pm
Saturday 9 am to 2 pm EST.

Gateway offers an extensive
range of finance
options. Call us for details.

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GATEWAY2000
"You've got a friend in the business."®



The art of investment

E-1000



Gateway's E-Series

Business solutions for networked environments

Snapping up a Van Gogh or two has long been a favoured investment of the business world but you'll get faster, better and more secure returns on the Gateway range of corporate systems.

Gateway's E-Series

All of our E-Series PCs are designed to use industry standard components to provide a low-cost, easy-to-manage and stable solution for high volume network environments, thereby reducing your total cost of ownership. Easy access cases, colour coded back planes and remote location servicing all work to keep things more efficient for you.

The E-Series family includes:

- E-1000 from \$1499 or \$13 p/w¹
- E-3000 from \$2049 or \$18 p/w¹
- E-3100 from \$2999 or \$26 p/w¹

Gateway's NS-Series

Gateways file servers come in models designed to cope with anything from a small workgroup to a large corporation. Our top machine is the world's fastest 6 way Intel Processor-based Windows NT server and can be configured with up to 12 Pentium® II processors using Microsoft® Wolfpack Clustering technologies. All Gateway servers are available with hot-swap RAID, rack mounting, and external storage options to give you the flexibility and power for the future.

The NS-Series family includes:

- NS-7000 from \$4999 or \$43 p/w¹
- NS-8000 from \$6799 or \$67 p/w¹
- NS-9000 from \$23999 or \$172 p/w¹

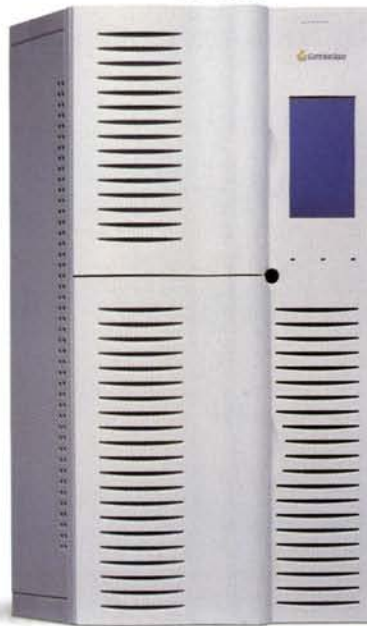
NS-7000



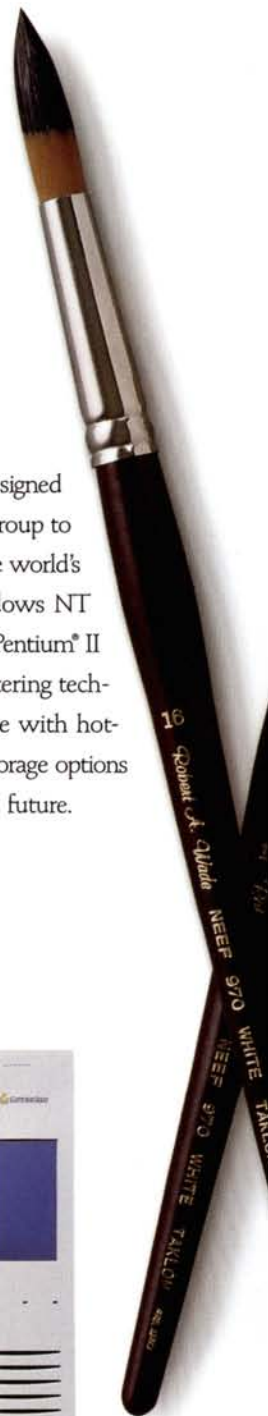
NS-8000



NS-9000



Gateway's NS-Series



Purchasing your masterpiece

Browse Gateway on the Web

Visit our web site and check out all the latest developments at Gateway. We've developed an amazing web page called The Configurator that lets you "build" a system exactly as you'd like it and then generate a quote. Choose the system you want, then place an order on-line. It's that easy. <http://www.gw2k.com.au>

Freecall

Our highly-trained telephone sales consultants are ready to answer any queries you may have about Gateway products, upcoming technologies, and industry trends. They operate much like an Information Line and will help tailor a PC that's a perfect fit for your needs. **1800 500 734**

Gateway Galleries

Gateway showrooms offer you the perfect opportunity to see exactly what it is that we do so well. You'll get expert advice on how to configure a system as well as the opportunity to examine different software packages.

So visit one of our showrooms.

Managed Accounts

Corporate and Government customers are individually served by our dedicated Account Management team. Our consultants will visit your site and discuss exactly how we can offer the best solution to your computing needs. Whether you're looking for an extensive network or a stand-alone system, we'll make sure that you get exactly what you require.

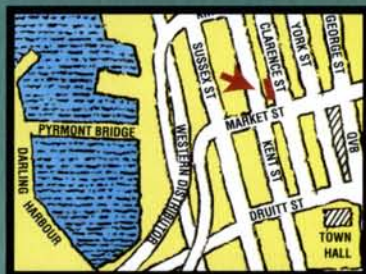
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<http://www.gw2k.com.au>

Or visit one of our showrooms.



How to find us.

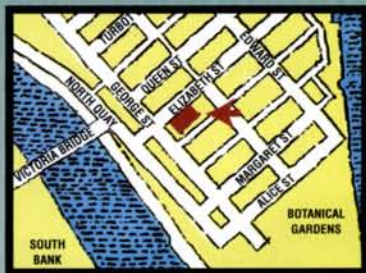
Visit us at one of our showrooms during business hours: Monday-Friday, 9.30am-6.00pm Sat, 9.00am-5.00pm:



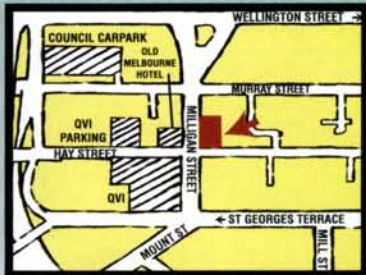
Sydney Showroom
225 Clarence St. Sydney



Melbourne Showroom
398 Lonsdale St. Melbourne



Brisbane Showroom
Shop 3, 47-79 Elizabeth St. Brisbane



Perth Showroom
938 Hay Street, Perth.

Gateway's classics

Winning Systems

Gateway computer systems have won awards all over the world. Here in Australia, we recently scooped "Best Business PC", "Best Home PC" and "Best Notebook" in the 1997 PC World Readers Awards. In November, we also took the PC Authority "Speed Award" for our G6-266. Earlier in the year our Solo™ 9100 was "Editor's Choice" in both Australian Personal Computer and Windows Sources. Naturally, we're sure there will many more award winning systems in 1998.



Gateway G6-266

- One-year discretionary on-site service for all desktop systems.
- Special upgrade options for enhanced service including hardware installation

and three-year on-site service.

- Thirty-day customer satisfaction guarantee.

Finance your dream

Whether you're an individual, small business or a major corporation, we can offer a payment plan that's tailored to your financial needs and order size. We offer interest-free finance, leasing, and rental plans with a range of payment terms. Call us for details.

We'll help you master your PC

At Gateway 2000 we understand that you're making a big investment. So we pride ourselves on fantastic after sales service. Here's how we do it:

- Lifetime toll-free technical support for all desktop (including monitors), portable and operating systems.
- Three-year limited parts and labour warranty for all desktop and portable systems.



Train with local artists

When you buy a Gateway PC, you can take advantage of a range of fantastic training offers from Executrain, one of the largest computer hardware and software training companies in the world. Whether you're a first-time user or require specialised application training, just ask for details and we'll help you find a training package that's perfectly suited to your needs.

Iomega ups the removable storage ante.

Iomega Jaz 2G

Since the Zip drive emerged from the Iomega research labs and redefined the whole idea of the floppy drive — or at least of removable media — the mobile storage market has never been the same. The capacity of hard disks has also spiralled upwards, and with them the file sizes that users want to store. What seemed massive just a couple of years ago is now mundane stuff. Consequently, Iomega has revamped its top-of-the-range Jaz drive, increasing the 1G storage limit to a capacity of 2G per disk, and also pushing up the data transfer speed.

Iomega says the drive is aimed at what it calls 'prosumers', that is, consumers with a professional bent. The Jaz 2G is a removable media pack about the same size, just slightly thicker than the old 1.4M floppy; but it holds more than 1,500 times the data, and is fast enough to support full-screen, full-motion video. Iomega says it's up to 40% faster than the original Jaz, with up to 8.7M per second sustained transfer speeds — not bad for a floppy-style drive.

APC's review unit (an external drive) came supplied with one 2G cartridge which contained all the relevant ZipTools, a power supply and a SCSI cable. Although this early review unit came with no instructions, the Jaz was extremely easy to set up. The power supply plugged straight in, the Ultra SCSI cable was connected to a Diamond FirePort 40 and the ID jumper set. If extra SCSI devices are required, the daisy-chain SCSI-out port can accommodate them as long as the terminal jumper is set correctly. When we switched the drive on and rebooted the machine, everything clicked sweetly into place and the Jaz was listed as 'removable drive D:'.

The external model is slightly more expensive than the internal SCSI unit, but it is a very versatile portable unit. It can be unplugged and connected to any Ultra-SCSI-equipped computer for large capacity high-speed data exchange whenever and wherever you need it.

When you insert the cartridge into the slimline dark green casing, two indicator lights flash as the drive recognises the car-

tridge type (the drive will also handle the smaller 1G disks, but at lower speeds); then the drive mechanism spins the platter up to its operating speed. And judging by the high-pitched noise and vibration, it's pretty fast. Once up to speed — after about 5 seconds — it smoothes out to a steady hum and the drive is ready to use.



Clicking icons provides virtually instant file listings. It is, in fact, as fast as any hard drive. Using the unit directly after a reboot, to avoid caching confusions, it took 9.6 seconds to fully load a 17M TIFF file. Opening the same file under the same conditions from hard disk (a Caviar 1.6G) took 12.1 seconds. Running video was also impressive, with barely a frame skip in sight, and smooth, clean playback even in the most complex scenes. Iomega says the burst transfer rate is up to 20M per second, with a minimum of just under 5M per second.

When we tested the unit using Ziff-Davis benchmarks, it achieved a Business Disk WinMark 98 of 513, and a High-End Disk WinMark 98 of 1,260. Although both scores compare quite favourably with medium to low-end hard disk speeds, using the Jaz instead of a hard disk is not really an option if you want the best possible retrieval performance.

However, the Jaz is not really all about speed, even though it is respectably fast for a floppy-like device. The kit comes with a comprehensive array of tools and utilities that make data storage and access a little bit easier. As well as the standard back-up utility, which Iomega says will back up 2G of data in around 20 minutes, Iomega has bundled in a clever program called App-

Mover from CyberMedia. This allows users to transfer not just data but also application files to the Jaz drive, then run them from the drive as though they were resident on whatever machine it is connected to. This is an excellent addition for those who want to demo or present in a variety of locations but don't have the right software on the local machine. Unfortunately for Mac and NT users, this app only comes in a Windows 95 version.

AppMover is complemented by a Guest utility that allows any machine to recognise the Jaz even if they don't have the right configuration loaded (as long as there is a SCSI connection). The other software extras include the usual back-up restore, file cataloguing and formatting options.

Overall, the Jaz 2G is a genuine step up from the rest of the pack, in terms of both speed and data capacity. Admittedly, it costs a bit more than the smaller capacity removable drives on the market, but this is offset by its slick installation and convenient size, as well as a reasonable set of software tools. Well worth investigating if you have large files that need to travel.

In spite of the fact that it is a good product, it will be interesting to see how Iomega prices this product (and its older 1G Jaz drive) in the light of the similar, but far cheaper products on the verge of being released by SyQuest (the 1G Sparq drive, to be followed later by the 4.7G Quest drive) and Castlewood Systems (the 2.16G ORB drive). If these products can live up to the pricing and performance claims of their developers, they could throw out a real challenge to the dominance of Iomega in the consumer removable storage space.

Jeremy Torr

Iomega Jaz 2G

- **Distributor** Iomega
- **Phone** (02) 9416 0434
- **Online** <http://www.iomega.com>
- **Price** External \$1,249, internal \$999. Disks \$799 for three.
- **In short** It's fast, neat and installation is foolproof; but high media costs are a slight drawback.

Of all the ways the BJC-7000 revolutionises printing, the most dramatic is the P-POP difference.

"Absolutely breathtaking" photographic printing. "Capabilities never before seen..." Then there is the big difference! P-POP.

"CANON PUSHES STATE OF THE ART..."¹

P-POP is Plain Paper Optimised Printing. As the "printer industry bible" (Hard Copy Observer) says, it "...pushes state of the art..."¹ to completely change plain paper print quality.

An all new approach. P-POP bonds an invisible ink optimiser to the paper before inks are applied. The inks, in turn, bond to the optimiser.

This dramatically reduces ink diffusion. Text and lines are better defined, colours are more vibrant and tones are sharper because the inks are not mixed in an unwanted way.

100% water resistant. P-POP also extends document usability.

Colours and blacks are far less likely to fade. And print-outs become water fast.



Multiple ink systems, 1200 dpi. The BJC®-7000 can use either of two colour systems with the black and ink optimiser cartridge. One system uses conventional CMY inks², and prints with resolution up to 1200 dpi, so that even photos can

be reproduced with extraordinary quality on plain paper with conventional inks using P-POP.

"ABSOLUTELY BREATHTAKING" PHOTOGRAPHIC PRINTING.

The other system is second generation PhotoRealism. As Hard Copy Observer says, "... (it) is absolutely breathtaking..."¹



The first "7-colour process". The secret is the PhotoRealism colour ink cartridge, included as standard. It uses a seven-ink process, conventional CMY, new lower density CMY inks, plus black. Also, thanks to P-POP it is the first low-density ink system that can be used on plain paper.



1. U.S. Hard Copy Observer, August 1997. 2. Optional BC-61 CMY ink cartridge. 3. Speed is an estimate and, for comparability, is based on a competitive manufacturer's color retail price, including tax. Canon Australia Pty Ltd ACN 005 002 951. Canon and the Canon logo are registered trademarks and PhotoRealism and P-POP are trademarks.

BJC-7000 – \$729 RRP

A new gold standard.
PhotoRealism is not a self-styled "photo-quality mode",

but a unique Canon invention that is fast becoming the gold standard of the industry, delivering near silver halide photographic quality.

9000% more colour! The inks can be combined and layered, producing up to nine saturation levels per colour, per pixel. This results in up to 90 times the colour combinations of traditional CMYK inks, and considerably better "process blacks and darks".

Almost invisible pixels. This, combined with the Canon Colour Image Processing System (CCIPS), completely changes the way both dark and light half-tones are reproduced. Colours have far finer gradations without banding and lines. And even on hard-to-produce light shades such as skin tones and off-whites "...individual pixels in the image are barely visible".¹

"(CARTRIDGE) CAPABILITIES NEVER BEFORE SEEN..."¹

Then, the cartridges "...are the largest we have seen ... (offering) new capabilities never before seen in a desktop inkjet printer ... (with more ink nozzles) than any other cartridge in the industry".¹

50% smaller nozzles. The nozzles are approximately half the diameter of previous models, so



drops per second, using up to 1088 ink nozzles.

Blacks 80% faster. There are 304 nozzles for black alone. This generates speeds up to 720 characters per second with bi-directional printing, and up to four text lines per head pass. Putting this in perspective, this is 80% more than the rated CPS speed of the Epson 800!

480 colour nozzles. There are 480 nozzles dedicated to colour in the PhotoRealism cartridge. (This is 150% more nozzles than the Epson 800.)

The BJC-7000 achieves colour speeds as high as 4 ppm.² And, thanks to PhotoRealism, true photographic quality can often be delivered at speeds far faster than printers using only conventional inks at high dpi.

Lower costs, better paper handling. Better plain paper use can obviously lower operating costs. There is also new, full-bleed A4 printing and the ability to print full card stock at paper weights up to 550 g/m² (0.8mm).

Canon Customer Care. Finally, the BJC-7000 features a one-year warranty, upgradeable to three years for minimal cost, and is backed by our Customer Care hot-line support. Drivers are available for DOS and Windows 3.1x/95.

If you would like to learn more, call us on 1 800 021 167.

Second generation PhotoRealism produces 9000% more colour combinations for "absolutely breathtaking" results.

text test. Actual speed will vary based on system and other factors. Canon estimates maximum colour graphic performance at 3.5ppm. Price as shown is recommended of Canon Inc. All other trademarks are the property of their respective owners.

CS/4372

Canon

Microsoft Internet Explorer 4 for the Mac

Since the revolutionary Version 3.0, Internet Explorer has been viewed as a first-rate browser for the Macintosh platform. It was lean on system resources, fast on page loading and its Java performance left competitors in the dust. Internet Explorer 4.0 doesn't disappoint on performance, and the new features push it to the forefront of the browser market — but there is a price to pay in stability terms.

The full install bloats out from 13M for IE3 to 19M for IE4, but includes NetShow and Outlook Express (for mail and news), plus a bundle of new features. The interface remains mainly unchanged, still following the same Macintosh-friendly feel developed for IE3 but including most of the features from the Windows build of IE4.

The first major change you notice is that the Explorer bar on the left-hand side of the screen springs out with a click or even just from holding the pointer over one of the tabs. The bar provides access to Channels, browsing history, Favourites

and a search capability. The Search frame defaults to loading a different search engine each day, and allows the list of search results to be kept in view while browsing. The Channels tab links to a list of Macintosh-friendly channel providers which currently number around 30. IE4 is also big on security, offering the means to control what active content can be provided for sites, and allowing different settings to be used for Internet and intranet access via the Security Zones feature.

A few of the highly touted features don't seem to work at all. For instance, the offline browsing feature, which promises to update subscribed pages for simple offline viewing, is currently a waste of space. To test the feature, APC subscribed to the IE4 information pages and set the offline browsing to capture images and follow links to one level deep. When told to update, IE did nothing. Eventually, setting the browser to grab three levels deep convinced it to start indexing and downloading, but it tried to pull the whole of

<http://www.microsoft.com>. Several trialled pages were consistently able to crash IE (which often chooses to take the whole OS down with it) even when it was the only application loaded.

Those prepared to stick it out through the problems, however, will be rewarded with a fully-featured and highly adaptable browser, as fast and lean as IE3. Hopefully, future point releases will strip away some of the problems.

Ari Weisz-Koves

IE4 for the Mac

Distributor	Microsoft
Phone	1800 686 400
Online	http://www.microsoft.com/ie/mac/
Price	Free
In short	IE4 is a good concept, and hopefully an IE4.01 release will iron out the problems.

Olympus C-1400L

Olympus has decided to be the first to break out of the standard, compact, pocket-sized box format and produce a single-lens reflex, TTL (through the lens) consumer digital camera. The disadvantage is that more complex optics make the C-1400L noticeably bulkier than the competition. But the advantage is that the image you see is exactly what the CCD (charged-coupled device — the image sensor) captures, without tricky viewfinder frames and distance zones, or a battery-sapping LCD. Olympus has also thrown in an f:2.8, 36 to 100mm zoom and a 1.4 million-pixel CCD to give an impressive top resolution of 1,280 by 1,024.

Although it looks a bit gawky at first, the layout and controls of the C-1400L are well thought out. Snapshot shooters can simply switch between play or record, adjust the zoom lever and shoot. The autofocus, auto-exposure system is based on Olympus' traditional SLR cameras and works fast and accurately even in low light. A pop-up programmable flash is provided for night-time or fill use. For more adventurous types, a broad range of exposure and focus options are available,

as is the selection of image quality.

The camera memory is one of the new Toshiba SSFDC (solid state floppy disk card) units, which is around 1mm thick or half the size of a credit card, and yet stores 4M of data. Olympus hopes to have 8M versions on sale within the next month or so, at around half the price of competing CompactFlash format cards. The SSFDC slots into the side of the body and swallows up to 50 standard-quality (640 by 512) images, but a meagre four images at the top resolution (1,284 by 1,024). The SSFDC can be slotted into a PC Card holder for use in any Type II slot, but this is not supplied with the camera.

The built-in LCD offers good image playback if required, with the usual range of multiplay or display options, but no direct TV connection. Instead you can opt to print directly to a dedicated Olympus dye-sublimation printer, or download images to the host PC using the supplied



software. Downloading top-resolution images does take a few minutes, and saps battery life fast. It would be well worth buying the external power supply that plugs into the camera.

That small gripe aside, the results are superb, with excellent tonal quality and definition; the lens quality takes sharpness right to the edge. At the moment, this is definitely state of the art in consumer digital cameras. It's pricey, but well worth it.

Jeremy Torr

Olympus C-1400L

Distributor	R Gunz
Phone	(02) 9935 6600
Online	http://www.olympus.com
Price	\$2,499
In short	Quality optics and high-res image capture in a consumer device. Traditional cameras beware.

New Super Economy mode lowers costs in colour and B&W to print page after page after...

For just \$199 RRP, the new BJC®-210SP delivers both Photo Mode quality colour, and black & white at a speed comparable to a personal laser. It also helps lower operating costs in two ways.

Use 75% less ink. A new Super Economy mode has been developed.

It reduces ink consumption by 75% compared to Standard mode, and works in both black and white and colour printing.

Bigger black cartridge. In addition, there's the new high capacity black ink cartridge that holds 20% more ink than our previous cartridge, yet costs no more.

Up to 5 times the output. Combine these two features and the new BJC-210SP can print up to 2400 pages in black and white, and up to 600 in colour.

That's anywhere from two to five times the output of any direct competitor!

Photo Mode quality printing. Using the colour cartridge, included as standard, the BJC-210SP offers a choice of three high quality print modes – Normal, Fine and Photo.

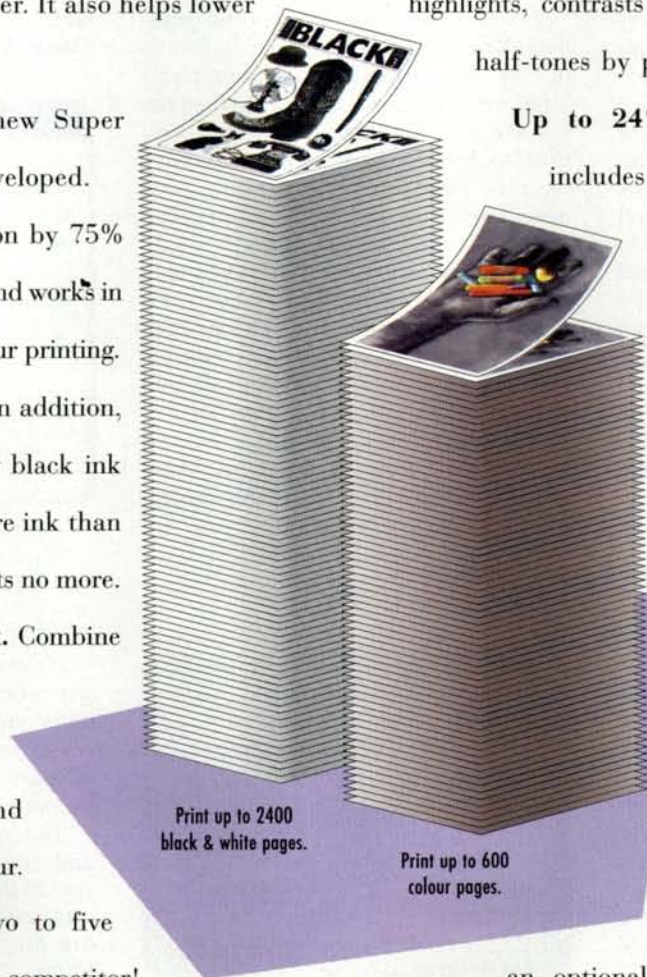
Advanced half-tones. Photo Mode uses the Canon Colour Image Processing System (CCIPS) to emphasise highlights, contrasts and shadows and visibly improve half-tones by producing a richer process black.

Up to 24% faster. The BJC-210SP also includes a black cartridge as standard. It has up to twice as many print nozzles as direct competitors, is up to 24% faster¹ and delivers resolution up to 720 dpi. Speed and quality are equally impressive in colour.

Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by hot-line support from our Customer Care staff.

There is also an optional fluorescent ink cartridge for high impact.

For more information on cutting printing costs call 1 800 021 167.



1. B&W speeds based on manufacturer's actual characters per second ratings. Price as shown is the recommended retail price, including tax. Canon Australia Pty Ltd ACN 005 002 951. Canon, the Canon logo and BJC are registered trademarks of Canon Inc. All other trademarks are the property of their respective owners. CS/4895

Now only \$199 RRP

Canon

Staedtler Mars

While inkjet printers get cheaper and cheaper, the hidden operating cost is still in replacing the ink cartridge. The cartridge rather than the ink is the real cost and the cheap solution is to just replenish the ink supply. In the past, this has tended to be difficult and very messy, and has meant using cheap contraptions to squirt ink back in the cartridge.

Staedtler has developed a solution for products that use Hewlett-Packard ink cartridges, such as printers and faxes. It has released a machine which refills black and colour ink cartridges at a cost somewhere in between that of buying a new cartridge and that of using a squirt refiller. A refiller for Canon cartridges is expected in 1998, but no relief is in sight for Epson printer owners.

Only cartridges which have just run out of ink can be refilled, not those lying around the office or home. The machine can also refill partly empty cartridges, and Staedtler claims it will detect if the car-

tridge's nozzles are more than 50% clogged.

The refilling tank was easily installed into the machine we tested. Our fax machine's cartridge clicked easily into the slot, then we just closed the protective cover and pressed the start button. Refilling took a couple of minutes.

It was a quick, easy process and printouts didn't show any noticeable loss of quality. We encountered some problems later, when our fax machine claimed the ink was out. A representative from Cost Cutting Solutions said customers have reported their printers registering error messages but realigning the printer after refilling should fix the problem.

The process of refilling cartridges may seem daunting at first, but in practice it is fairly straightforward. The machine does not allow the cover to be opened while the cartridge is being refilled and will stop refilling if the cartridge has dried up.

The black ink model tested by APC (73500) retails for \$299, which includes a tank for at least three refills. After the ini-

tial cost of buying the machine, Cost Cutting Office Solutions estimates each refill will cost around \$13, compared to \$46 to buy a new Hewlett-Packard cartridge. The machine itself, however, does not last forever. According to Cost Cutting Office Solutions, its life span is at least 1,000 refills.

Claire Waddell

Staedtler Mars

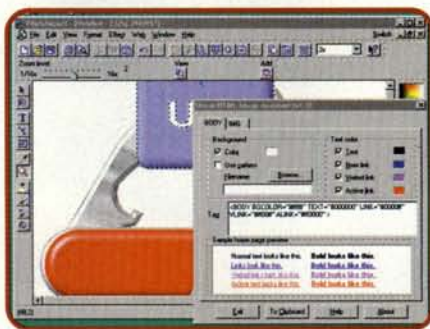
Distributor	Cost Cutting Office Solutions
Phone	1300 659 909
Online	http://www.staedtler.com/english/index.htm
Price	Refill machines range from \$280 to \$319; tanks range from \$53 (3 black refills) to \$120 (4 colour refills)
In short	An inkjet cartridge refiller which is quick, easy and clean, and cuts costs.

Ulead PhotoImpact 4

Ever since it first entered the market with its Image Pals product a few years ago, Ulead has been chugging along producing image-handling and cataloguing software. Mostly selling product as bundled software with scanners or other OEM equipment, it has not really hit the big time compared to names such as Micrografx, Adobe or Corel. Its latest releases, however, such as Media Studio Pro 5, and now PhotoImpact 4, are aimed squarely at the new buyer, with many more consumer-oriented features and front ends.

PhotoImpact is a slightly misleading name, as it works much more like a mid-range illustration package than a pure photo-manipulation package. Its biggest change from previous versions seems to be a very heavy emphasis on Web capability, although there are still plenty of straight illustration features. New Web smarts include special image and animation optimisation, which enables compression to the smallest possible files while retaining reasonable Internet-compatible quality.

Other Web-specific design features include HTML slide-show and button sup-



port, direct Web publishing, URL image support and Web-style previewing.

The one-click optimisation for sharpness, contrast, saturation and so on would have appeal for first-time users. These are macros which analyse then apply set corrections, and users can also create their own mini-macros if there is a set of manipulations that need applying repeatedly over a series of images. More sophisticated controls can be applied, such as object layering, drag-and-drop image effects and the usual masking and combining. Viewing finished image status is simplified with the provision of 'quick and dirty' thumbnails. This is much better than waiting for endless redraws.

PhotoImpact also offers a comprehensive set of text manipulation tools which allow the designer to create and store a whole range of specific 3D words or logos. All the usual texture, emboss, colour and shaping tools are included.

The package includes a swag of clip art and animations, which provide a good start to the new user. There is also a set of customisable Web page templates, which are more than adequate for getting started. Overall, a very simple and competent photo-illustration package with some useful extras for the newbie Web designer. But for the serious designer, perhaps a little light on extra features.

Jeremy Torr

Ulead PhotoImpact 4

Distributor	Lako Vision
Phone	(03) 9852 7444
Online	http://www.ulead.com
Price	\$195
In short	A very usable and good-value photo and text manipulation package.

Brilliant colour, PhotoRealism and an extra large print head for faster blacks.

When it comes to versatility, the BJC®-4200 is ahead of its class.

Four printing systems. It accepts a choice of four different cartridge-based printing systems, designed to tailor your output to your printing needs. Two are included in the box as standard.

Photo quality CMYK. The first standard system is four-colour process printing, with driver settings for Economy, Text and Photo. The Canon Colour Image Processing System (CCIPS), and resolution up to 720 dpi, gives you outstanding half-tones by combining pure and process blacks.

Blacks at twice the speed. The other standard system, specifically for black & white correspondence, is an unusual feature.

It is a dedicated, extra large black ink cartridge with 128 print nozzles capable of printing two text lines at speeds up to 510 characters per second.

Don't be confused. Many manufacturers make all sorts of claims about pages per minute. But, in reality, using their own characters per second ratings, you'll find that the BJC-4200 can be more than twice as fast! (Also see output chart.)



Canon's exclusive PhotoRealism.

Third, there is Canon's unique PhotoRealism.

This option is more than just a claim, it is fast becoming the photo quality printing gold standard.

500% more colour combinations. Special low-density inks can vary the amount of saturation per pixel so that a single dot could have 0%, 33%, 67% or 100%.

This produces up to five times as many colour combinations as conventional CMYK inks.

Virtually no pixelisation. The result is better half-tones and more subtle colour gradations, with almost no visible grain and dots, even in areas of low colour density.

Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line

support. Finally, our fourth ink system, Fluorescent ink, is also an option, and drivers are available for DOS, Windows 3.1x/95 and Windows NT.

If you would like to learn more about tailoring the highly versatile BJC-4200 to your printing needs call us on 1 800 021 167.



Price as shown is the recommended retail price, including tax. Canon Australia Pty Ltd ACN 005 002 951. Canon, the Canon logo and BJC are registered trademarks and PhotoRealism is a trademark of Canon Inc. All other trademarks are the property of their respective owners. Competitive print speeds are the actual published character per second ratings of the respective manufacturers.

CS/4896

Now only \$299 RRP

Canon

Repeating mistakes

There is only one thing more stupid than making an obvious mistake, and that's repeating one. Intel had the Pentium for the low-cost consumer market and the Pentium Pro for the premium market. When the time came for its next consumer product, the Pentium II, it enhanced its previous premium product and priced it above even that. Then it wondered why everyone kept buying Pentiums and equivalents offered by competitors. Most people would have been amazed that Intel so thoroughly failed to understand a market it dominated.

So what has Microsoft given notice its going to do? It has announced it is going to base its next consumer product (Windows 2K?) not on its current consumer product (Windows 9x) but on its current premium product (NT). Doesn't that look exactly like the mistake Intel made of failing to understand that the consumer market likes features and performance, but unlike the corporate market it puts value first of all?

Gordon Drennan
Ultimo, NSW

Deja vu

When I read Chris Goss' letter in Service and Reliability [APC January, page 53], I could not believe it. It was as if Mr Goss knew exactly what had annoyed and frustrated me three months ago when I encountered exactly the same problem with Westan in Brisbane.

After being told I may have had a stolen drive, I checked the Western Digital's Web site only to find the drive was not stolen. I got

back to Westan which said it could do nothing to help me and I would have to go directly to Western Digital in the US.

I visited Western Digital's Web site again and left a message. I was told I would need a return authorisation number before I could return the drive and they proceeded to give me a fax number in the US that never answered. The cost of this started to mount, so I decided to cut my losses. On the wall of my office, I mounted the drive with a sign that reads: "Western Digital Caviar 2850, manufactured 24 January 1996, three-year warranty — what a joke! No support. Never deal with Westan or Western Digital again."

Christopher Puli
Brisbane, Qld

Deja vu 2

I have just read the letter from Chris Goss in the January 1998 Service and Reliability column. I too have had the unfortunate need to speak to Westan in Brisbane regarding a faulty hard drive I purchased from a vendor who is no longer trading. When I explained my situation to the rep that answered the phone, I was told that they were not interested and that possibly if I took the drive to another dealer and paid a service fee, they may be able to exchange it for me.

Eventually Westan agreed to take a look at my drive, but told me they had no record of that particular serial-numbered unit being sold in Australia and as such would not service or replace it.

But they kindly decided not to charge me a service fee.

Dave Elliott
Ipswich, Qld

Pecking order

On December 18, 1997, I purchased a Logitech PageScan Color Pro scanner from Harvey Norman in Windsor, Brisbane. It had advertised these scanners for sale for \$89 each, and as I had seen them priced at \$549, then \$299, it was a bargain. After getting it home I spent the next 24 hours trying to get it to work, doing everything the manual (such as it is) instructed. The program kept coming up with "Scanner not detected". In desperation I rang Harvey Norman to get some help. Its service department suggested I bring the computer and scanner in and they would get it installed at a cost of \$49. I said [that was ridiculous], as I only paid \$89 for it. They could not offer any suggestions as to what the problem was, much less how to solve it.

I decided to ring the Sydney agent, Dataflow. They suggested that I ring Logitech, and in a call lasting a total of 1 minute and 39 seconds, I was able to explain that I had a Compaq Presario 7150 and a Lexmark 2030 Color Jetprinter, and the problem I was having installing the scanner. Logitech's technician told me to go into the SYS.INI file and remove the line DEV=LEXSW.386. I did this and now everything is working perfectly. The scanner is doing an excellent job and I am very happy with it.

The quick service from Logitech is really something after the delays and fobbing off one can get from other companies, and I think that its service department deserves a pat on the back for knowing their product so well.

Arthur Robinson
Stafford, Qld

I need a new PC.
Which should
I buy?



Where's
all this tech-
nology heading?
What's it mean for me?



The other half of your portable office, because it can be both a printer and scanner.

IrDA cable-less communication
for printing and scanning.



Read the features and you'll swear the BJC®-80 would use half your desktop, not half your briefcase.

Breakthrough colour technology.

It's hard to believe that colour this good can come from a printer so small.

But, that's what you get with a patented new process called Drop Modulation Technology.™

Two ink drop sizes. It produces dual drop sizes in all four CMYK inks, in resolutions up to 720 dpi. The result is smoother colour gradations and less grain on all paper types.

High speed blacks. In seconds you can switch to a special, black only cartridge with 128 print nozzles. It offers laser-like speed and text smoothing for highly finished correspondence.

Send a fax, scan in colour. Next there's the optional colour scanner head. You can simply substitute it for the printer head.

There is a high-speed mode for faxing* and a high definition mode. The latter is ideal for colour graphics and OCR, and reads up to 360 dpi, 128 monochrome levels for OCR, and 64 colour levels for RGB.

IrDA for wireless operation. The BJC-80 accepts an optional battery pack as well as standard power. And to make your life easier, it comes with a Windows 95 infrared IrDA compatible port for cable-less communication.

Better Internet images.

The BJC-80 even includes an Image Optimisation feature that reduces the jagged images and faded colours common to Internet images, and works with a variety of graphic applications.

Canon Customer Care. The BJC-80 features a one-year warranty, upgradeable to three years for minimal cost, and is backed by Customer Care hot-line support. Drivers are available for both Windows 3.1x/95 and Windows NT.

To learn more about the other half of your portable office, call us on 1 800 021 167.



*Fax function requires appropriate software and Windows 95. Price as shown is the recommended retail price, including tax. Canon Australia Pty Ltd ACN 005 002 951. Canon, the Canon logo and BJC are registered trademarks and Drop Modulation Technology is a trademark of Canon Inc. All other trademarks are the property of their respective owners. CS/4446

BJC-80 – \$499 RRP

Canon



Away from it all

Is the rise of the telecommuting phenomenon making it impossible for us to really go on holidays? And if so, at what cost to health and family, not to mention productivity?

By Helen Dancer

It's bad enough that I don't have a mobile phone. I stubbornly choose not to own one, in fact. People look at me blankly when they ask me for my mobile number and I tell them I don't have one. But when I declared that I wasn't taking my notebook with me over the Christmas break, so people should not bother sending me email, it was as though I'd just announced I was planning to join a back-packing expedition to Antarctica.

When did we start taking it for granted that if a person wasn't in their office or at home you'd still be able to call them, because they'd be carrying a phone around with them?

And, more disturbingly, when did we make the quantum leap from that view of the world to the assumption that even though a person was on holidays, you'd still be able to reach them by email?

Chris Morris, from the Gartner Group, acknowledges that the push towards providing laptops as part of the standard toolkit for PC-literate employees plays a big part in the notion of continual connectedness, and agrees there is a huge social and family cost, but also many advantages.

Rapid growth in the laptop market — in the realm of 40% or 50% per annum, he said, has fuelled the notion that wherever a person is, at whatever time of day, they are contactable. Not necessarily instantaneously in contact, but infinitely contactable.

And even though the average cost of ownership of laptops over desktops is an extra 40%, the return on investment in terms of improved employee productivity is proving to be worthwhile. Anecdotal, said Morris, the higher capital cost of a notebook over a desktop is easily justified. An employee supplied with a notebook will usually experience a rise in productiv-

ity of an extra three or four hours a week, which, on a salary of around \$70,000 or \$80,000, is a pretty good return on a company's investment.

They are not necessarily standard hours either, said Morris, which means that having a notebook around the house usually means you'll dial up to check your email early in the morning, before you get into the traffic to get to the office, or even on the weekends, and increasingly, those times idiosyncratically designated 'holidays'.

There's very little time when people are not working, Morris acknowledged, especially employees of multinational compa-

edges. On the one hand there's the assumption that the person has a laptop nearby and is prepared to use it, but on the other, there's the finite expectation that doesn't yet make the leap from 'email sent' to 'email read'. People are still more likely to ask, 'Are you picking up your email?', than just assume that because they've sent it, you've read it.

But the question is being asked with increasing regularity, implying a degree of pressure. It's all too easy to draw the inference, 'And if not, why not?', as if the notion that you need to get away from it all signals a lack of commitment to the project or the team. When, in fact, the

When did we make the assumption that even though a person was on holidays, you'd still be able to reach them by email?

nies whose working hours have become elastic because they share projects and resources with colleagues in overlapping time zones.

The upside to the argument is faster turnaround time for queries and information transfer. I know this to be true from my own experience, liaising with APC's US correspondent. My early morning emails to him usually elicit a response by the time I get off the traffic merry-go-round and arrive in the office — much better than succumbing to the 24-hour turnaround that we'd both endure if I had waited until later in the day to ask the question. The downside is that chunks of weekend (aka relaxation) time get sucked into the vortex, because once you've read an email you almost always feel duty-bound to answer it.

It's a matter of expectations on both sides of the equation, Morris acknowl-

edgement that you need a break is a much more mature and committed approach to both.

Thus the very thing that's making us all so apparently much more productive actually has the potential to make us less so. Isaac Newton would have approved. All that theorising about equal and opposite forces was spot on. In just the same way that nobody works at their best if they are sleep-deprived, being recreation-deprived over long periods of time can only deplete productivity and inspiration.

Most of the new year's resolutions I've heard uttered this year have had to do with stress reduction. How many of those will be broken next time the resolution-makers announce their intention to take a week off and the boss says, 'Oh, by the way, I assume you'll be taking your notebook?' ■

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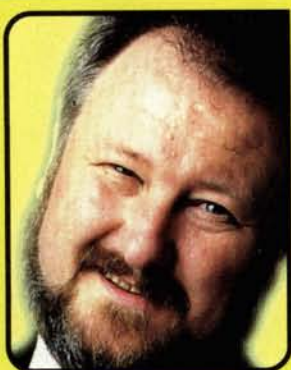


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CS 4854

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A time of evolution

Do we understand how computers are changing society? Is society changing to adapt to computer technology, or are we changing computers to fit with the way society works?

By Jeremy Horey

Last year in Australia there were fewer people killed on the roads than in 1996. In fact, in 1997 the road toll was the lowest since we started keeping track of how many people were killed on the roads each year.

This is good news. It means that we are making the roads safer each year, even though the number of cars on those roads is increasing and, on average, we are travelling more kilometres in cars every year.

It was not until the 1950s that the different states started keeping track of the number of people killed in traffic accidents. Since then it has taken us 40 years to get on top of the problem. We have been designing and building cars since the end of the last century. We have had driving tests and sets of road rules for a shorter time, but still for nearly 90 years. It has taken all this time to start getting the combination of all these factors right so that we don't have so many people killed on the roads.

In the case of the road toll, it was a combination of factors that made things safer. Society adapted by changing the way human beings did things. We educated people about the dangers of drinking too much alcohol and then driving. We also made sure that we eliminated some of the more dangerous drivers.

As well, the technology was changed. We built safer cars and improved the road rules. We also built better roads.

What this illustrates is that while technology can develop very fast, it often takes considerably longer for that technology to be adapted to fit well into society.

We are in the middle of a period of profound change. The computer revolution has already changed the way that most of us work. Now we are in the middle of an even more important set of changes that are affecting the way we communicate. This communication revolution is based

upon computer technology. It uses that technology to enhance how information is transmitted and presented. It is also changing the way we exchange ideas and opinions with each other.

While the changes are made possible by the technology, the impulse to adopt those changes is coming from our desire to change the way we communicate. We have become dissatisfied with the limitations imposed by conventional media on both the producers and consumers of information. Conventional media uses set formulae. The newspapers are laid out in the same way and news broadcasts are put together in the same way no matter which channel you watch. News is predigested and its content is often determined as much by the limitations of the medium as by the available material. Most channels

of thousands. There is no way that there can be any meaningful dialogue.

At the same time there is no opportunity to provide depth or background material. While a magazine such as this has the space to run articles that are very long, in a newspaper very few stories get more than 1,000 words. If there is more to be said it is often made into a new article — as though the reader couldn't be trusted to read more than 1,000 words in one go.

On TV the problem is even greater. News stories are slotted into smaller and smaller slices of time. Very few TV shows have the time to look at a subject in any depth. If they do spend more than a few minutes on a story, they are classified as documentaries and relegated to marginal viewing times.

I could go on here. There are plenty of

While technology can develop very fast, it often takes considerably longer for that technology to be adapted to fit well into society.

won't run a news story if there is no footage to go with it.

Advertisements are increasingly intrusive. On commercial TV they break the flow of the drama or they limit the size of the story segments.

Every commercial station runs them at 15-minute intervals, no matter what is happening in the main show. The idea that the ad breaks could be tailored to fit into the show is not only completely foreign, but also too hard.

In the conventional media, there is very little chance to answer back or engage in dialogue with the people who produce the content. The ratio of consumers to producers of information is too high. On TV, a handful of journalists produce a show that is watched by hundreds

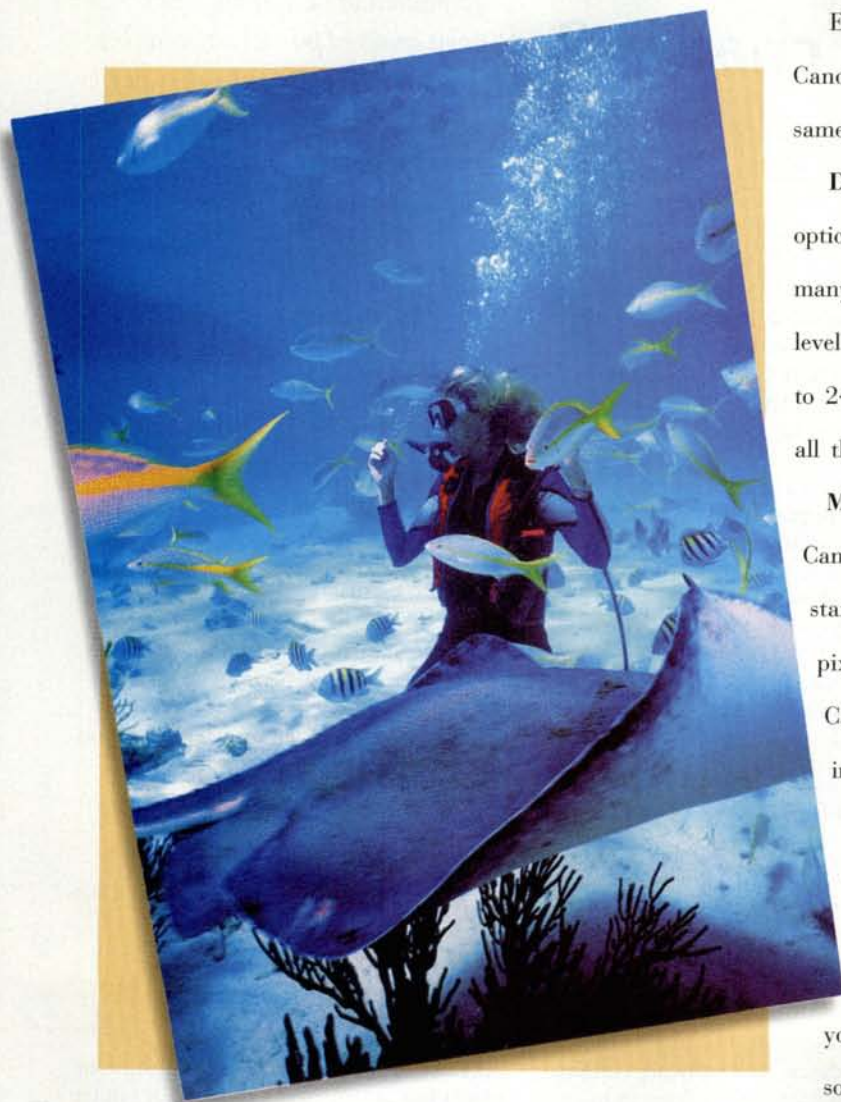
problems with the conventional media. What computer technology does is provide an alternative to conventional media. It won't replace it; it will provide a new channel that is not limited in the same way. It will complement it.

But it is going to take us a long time to get it right. We are in a period of experimentation. We are learning what computer-mediated communication can do. We are learning how it fits with conventional media. We are finding out how to change the technology to make it work. We are also finding out how to change society so that the new medium can work.

It is an exciting time.

**You can reach Jeremy Horey at
jhorey@ozemail.com.au.**

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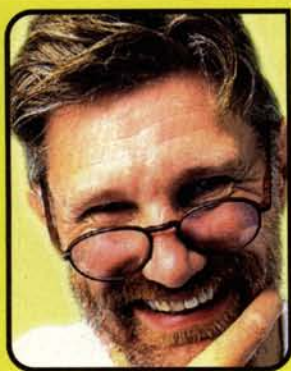
Model	CanoScan 300	CanoScan 600
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CS/4370



Canon



Trade shows: Time for a change?

According to some reports, IBM isn't pleased with the results it has been getting from the Comdex Fall exhibition. And the likes of Dell and Apple are rumoured to be winding back their levels of participation at the giant US expo, because they just aren't sure they are getting value for money.

By Jeremy Torr

There are various avenues for information exchange in the IT industry, the central ones being reading magazines such as *APC*, asking questions at a local retail outlet, browsing the Net, and even occasionally reading some of the junk mail sent by software companies. But for some buyers, the only major avenue for personal contact is an exhibition or trade show.

In the early days of the computer revolution it was down to the intrepid few to attend, and carry news back to their coven to be disseminated and chewed over for the next few weeks as purchasing decisions were made and IT strategies worked out. Now the potential purchaser can source info over the Net from anywhere in the world with as much detail as they want. Via email they can obtain the person-to-person particulars they require when it suits them, without the sore feet and exhibition overload that any trade show demands. In fact, there is often more factual information available on the Net than from sales staff at an exhibition trade booth.

The only advantage of a trade show is its reality, as opposed to the virtual reality of the Net. But an enormous number of 'launches' at recent trade shows have been either highly approximate vapourware or empty boxes with buttons and lights on the outside, so the reasons for being there in person are rapidly diminishing.

This means the kind of person attending the shows is changing too. The real decision makers and corporate bean counters can get all the info they need from cyberspace, where they can then refine their choices and even order directly. Or they can use the medium to

arrange a meeting with a representative to nut out some kind of a deal. Again, without the tired limbs and sensory overload that the trade show demands, and with personal, one-to-one service. Consequently, the majority of show attendees are now not the high-profile corporate cheque signers that the exhibitors would like to see rolling up to their stands, but what the trade rather unglamorously calls tyre kickers. That is, the peripheral equipment groupies who might buy a DVD drive if it were heavily discounted, but who would be extremely unlikely to put in an order for 300 Pentium II machines.

Unless show organisers make a move to offer value-added services, they are likely to get short shrift from an increasing number of companies and potential attendees.

Many hardware and software companies are being driven by tighter margins to look carefully at how they market their products. Companies like Dell and Gateway are moving the industry perception away from the traditional 'display window' mentality towards a model where the buyer knows what they want and orders on specification — without ever seeing a product in the flesh, but backed up by some very sophisticated point-of-sale and promotional material. Admittedly this model can only work in an environment where the buyer is educated about, and well aware of, the value of product they are buying, but this is increasingly the case in today's market anyway.

So, if the trade show or specialist consumer exhibition is to survive both overseas and locally, it will surely have to change what it has on offer. It has to present more than just a series of stands in which tired-looking salespeople try to make eye contact with the stream of casual browsers — even if the technology on show really is the latest and greatest. Unless show organisers make a move to offer value-added services, they are likely to get short shrift from an increasing number of companies and potential attendees.

To attract a hardened sceptic like me — who, unlike the mass of attendees, doesn't even have to pay to get in — a show stand

must be able to offer unique insight or education in new developments, or I must be able to see and hear some otherwise inaccessible gurus of the industry. If I knew I could hear Larry shout at Bill, or hear Alston defend his communications decisions to Malcolm Turnbull, you wouldn't be able to keep me away. If I could hear Frank Blount giving us his vision of where Telstra will be going in the next five years, or see a presentation from a top Intel or Iridium engineer I would also be very interested. But if the only things on offer are more racks of modems, glossy handouts and girls in bunny suits, then I think I may be taking the IBM approach, and considering carefully the value of that eroded shoe leather. ■

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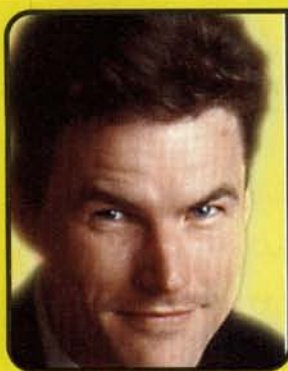
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CS/4368



Scheduling in style

Let me check my diary . . . Pause.

By Bruce McCabe

Picture the scene: first thing Monday morning and I'm on the telephone to a guy working for a well-known technology company. We have been chatting away, catching up on what he's been doing over the past couple of months since I last spoke to him, and shooting the breeze about the latest policy announcements from the federal government which are supposed to 'revolutionise' Australian IT manufacturing. We get past the preliminaries to the real reason for my call: I want to make an appointment for him to brief me on one of his products and to discuss the development road map for 1998.

"Yeah, sure," comes the response. "When would you like to do that?" After briefly checking my own appointments, I respond, "Well, I'm free Monday from two to four, Tuesday first thing, and anytime Friday afternoon." Silence. A good 10 seconds go by. "Have you got your diary handy?" I ask. "Oh yes, I just have to boot up first." Another minute of silence follows. He's gritting his teeth and cursing himself for not having turned on his PC earlier. He feels compelled to say something and so begins narrating the boot procedure: "Windows 95 logo is up . . . desktop coming now . . . still got the hourglass . . . starting my calendar . . . OK . . . few more seconds . . . I can schedule you in for Friday at two."

This was not the first time this has happened to me, and it won't be the last. I was bored waiting and felt like I had better things to do. I almost asked him to call me back after his PC had booted up and his calendar was running. If I had been a potential customer, rather than an analyst, my enthusiasm would be slipping away while the clock ticked.

I recommend switching to the diary system I use. It takes less than two seconds to open, and immediately brings up the correct page, which is bookmarked.

Once opened, the viewable area is a whopping 38 by 26cm. It is crystal clear, with unbelievable resolution, and I have no trouble seeing it in all light conditions. In fact, it's so good I can view a whole week of appointments at once, without having to resort to scroll keys. I never complain about the speed or accuracy of handwriting recognition software as the text always appears exactly as I write it. My task list is included at the bottom of each day, with ticks alongside those I have completed, and it takes exactly 20

updated by either themselves or the secretary.

And avoiding that boot-up delay is possible by opting for a PDA-type solution, of which the most popular is the US Robotics PalmPilot. These offer instantaneous access to the diary, and are small enough to be no burden to carry around in a pocket. But what a tiny screen! Try getting a week's appointments to fit on that! And then there is that issue of having to learn the Graffiti shorthand to use the stylus. OK, I've tried it and it doesn't take too long to learn, and

One thing I'll never understand is people who maintain both paper and electronic diaries.

seconds to transfer uncompleted tasks to the following day. It weighs less, and is slimmer, than any ultraportable on the market, sliding easily into my folio. And it's bulletproof: you can close it without warning, drop it, jump on it, leave it in the sun or place it beside industrial-sized magnets. You can even drive a bus over it, and under no circumstances will there be any data loss. My diary, as you have no doubt already figured out, is a paper one.

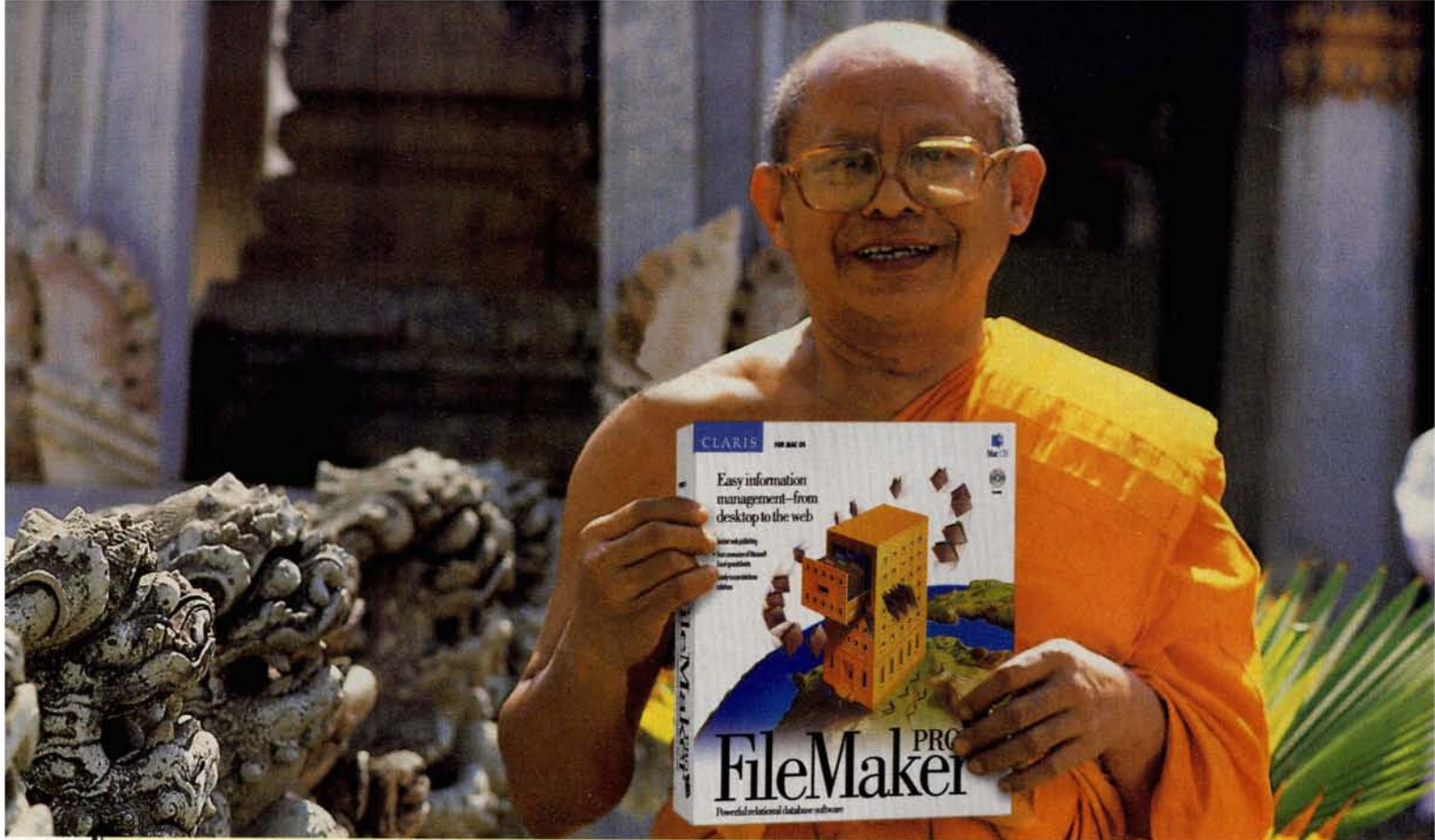
I'm being just a little facetious, because electronic diaries do have some advantages. In particular, if you are on a network and using the right software you can link diaries with your colleagues, which is a fabulous way of checking when people are available, thus avoiding clashes when scheduling meetings. The same system can be used to book resources such as meeting rooms and overhead projectors. Those privileged enough to have secretaries like electronic diaries because they can be accessed and

yes, the Pilot can provide more functions than just that of a diary, any of which might be enough reason to buy one. My point is that there are a heck of a lot of compromises involved in 'going electronic' and, where diaries are concerned, paper still wins almost every time.

One thing I'll never understand is that amazing group of people (of which I have encountered many) who maintain both paper and electronic diaries, diligently synchronising them whenever they get a few moments in their day. Although these people effectively double their administrative workload in the process, they are always prepared to defend this practice with a whole range of weak excuses.

Next time you contemplate moving to an electronic diary, consider whether the benefits really, truly outweigh the disadvantages.

.....
Bruce McCabe is senior industry analyst with Gartner Group/Dataquest. He can be contacted at bruce.mccabe@gartner.com.



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Technical change and unemployment

Solving the problem of world unemployment requires a shift in attitude.

By Julian Ehrlich

Unemployment stubbornly remains. Everyone blames different factors: short-term or short-sighted governments; international trade; ogre capitalists; or the unemployed themselves. They are accused of being 'lazy' in seeking nonexistent jobs, of being overpriced, unskilled, and even of living in the wrong places. Most people also allocate substantial blame to technical change, the Jobs Grim Reaper, mowing down gainful employment. But who really knows what unemployment is? Consider .

Scenario 1: Some children in Dickensian England would have been regarded as unemployed if they spent a day without paid work, even if they had attended school. This was not the case, of course, for children of the upper classes. So unemployment is more complex than simple lack of income or a 'job'.

Scenario 2: A company fails, leaving a 55-year-old worker 'unemployed'. Each day the unemployed ex-worker sits beside a 55-year-old ex-executive of the same company who opted for 'early retirement'. They sit, idly chatting, watching the ocean. But one is unemployed, the other 'retired'. Is unemployment a function of unfulfilled demand for a job? Lack of 'approved activity'? Lack of 'approved income'? What makes the ex-worker unemployed and the ex-executive not? Their own definition? Class? Access to alternatives?

Scenario 3: Rural idyll, bronzed farmer surveying the land from beneath a battered Akubra. There's no drought, but rain is scarce, prices low. With only enough farm work for three days a week is the farmer 'fully employed'? 'Partially unemployed'? Where's the line?

Scenario 4: Teenage wannabe rock band is suddenly signed with a recording company and starts touring. They still make only noise, all monies going to the recording company, venues, managers,

and accountants. Does the mere promise of income mean they are now 'employed'? Whose promise?

Unemployment remains a problem because it is based upon arbitrary social definitions. Everyone uses the word differently, adjusting definitions to circumstances.

So, when trying to understand 'causes' of unemployment and, worse still, trying to 'cure' unemployment, we tangle in distracting assumptions about cause and effect. One major area of confusion is the role of technical change.

Thunder, often associated with rain, does not *cause* rain. Technical change, often associated with unemployment, does not *cause* unemployment.

Unemployment remains a problem because it is based upon arbitrary social definitions.

Yes, technical change often eliminates 'tasks'. If those tasks are bundled into 'jobs', then, with enough technical change, jobs do disappear. The conundrum is that economic growth is (possibly) synonymous with making tasks obsolete. Eliminate enough tasks and jobs disappear too.

Today's living standards would not have been possible if jobs of earlier ages had been protected. If workers in those ancient jobs had reduced their incomes ever-lower each year to keep change at bay, we would now have grinding poverty, misery and disease.

The skills of today's bank clerks, accountants, train drivers, smash repairers, Cobol programmers, and myriad others are destined for the skills museum alongside Neanderthal flint knappers, pyramid decorators, wainwrights and whalers.

But an important distinction is needed: replacing *skills* is central to economic devel-

opment, but replacing *jobs* is not. Converting wainwrights into car body builders is one thing; wainwrights to waiters is different. Converting Cobol programmers to object-oriented programmers is one thing; Cobol programmers to couriers quite another.

All these changes produce gainful employment. But the latter option in each case moves our economy down the food chain from technically complex skills to technically simple skills, from wealth creation to wealth shuffling.

So what is 'unemployment'? It is an externalised cost, a sign of modern times.

Costs externalised to the environment are called 'pollution'. Costs externalised to the government (taxpayers) are called 'tax breaks'. Costs externalised to the

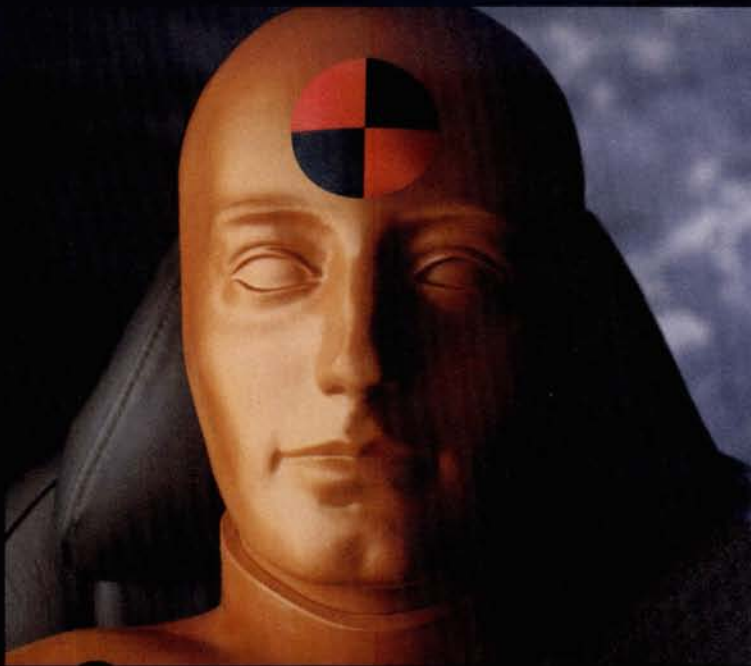
streetscape are called 'litter'. And costs of technical change externalised to those who built the foundations for that technical change are called 'unemployment'.

The issue is that the benefits of technical change — higher profits, lower prices, more choice — are available to all, but the costs are borne by a few. Solving unemployment, like solving pollution, requires an attitude change — stop externalising costs. Pay your own way.

The ability to build cars that can travel at 230km per hour is no reason to *make* them. If we do make them, social and environmental costs must be factored into the price. Buyers must pay their own way.

The ability to build umpteen terahertz networks is no reason to *deploy* them. If we do deploy them, social and environmental costs should be factored into the price.

Winner-takes-all attitudes, not technical change, cause unemployment. Just hope you don't lose the next round . . . ■



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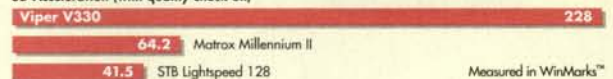
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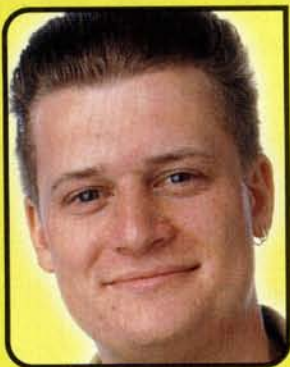
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Apple's Messiah complex

While Apple awaits the One True Messiah, Steve Jobs is getting on with the job.

By Dan Tebbutt

For long-suffering Mac users and developers, January's MacWorld Expo in San Francisco came as something of a relief. Breaking with unfortunate recent tradition, attentions at the Apple tribe's main corroboree did not focus on some melodramatic and painfully debilitating trauma. There was none of the theatre of the corresponding event last year where lacklustre former leader Gil Amelio presided over the triumphant return of company co-founder Steve Jobs. The anguish of the historic Microsoft twist in Boston last August was just a memory.

Nor, for the first time in many years, did the MacWorld keynote launch some slick-but-silly new strategic direction. Amelio's slow-release Copland plan was all but forgotten, while Jobs went through his entire speech without mentioning Rhapsody, the emerging advanced platform that dominated discussion around Silicon Valley during January 1997.

Replacing the traditional burlesque was a showcase focused on the realities of Apple's business. Jobs delivered a report card on the operations overhaul he launched in November, including promising improvements in retail sales where the store-within-a-store concept has been realised. Web vending looks similarly successful, although Jobs and his lieutenants were loath to offer enlightening figures, lest they raise the spectre of disquiet in the reseller channel.

Demand forecasting has been a notorious Apple failing in recent times, and the flourishing new PowerPC G3 systems were no exception: some 133,000 units were shipped, two-thirds more than the company expected. In another break with the past, however, the company managed to

service most of the unanticipated demand because its new Dell-style build-to-order model meant greater capacity flexibility, customer responsiveness and timely delivery of the coveted products. While the Australian subsidiary is currently pursuing different strategies, parental success suggests it's only a matter of time before local consumers can order tailor-made systems through the Web.

Jobs outlined Mac OS 8.1, another minor upgrade that's arrived without the usual litany of delays and excuses that accompany Apple deliverables. In the background Rhapsody makes steady progress. QuickTime inventor Peter Hoddie came on stage to exhibit the latest version of the multimedia software that is one of Apple's strongest remaining distinctions. Another product shipping on schedule: is this the same Apple?

Past CEOs promised embattled Mac developers the world but delivered little real improvement (with former developer relations manager Heidi Roizen's brief tenure an egregious exception). Amelio specifically promised to improve Redmond relations, with few tangible results. Perhaps it took the brazen approach of Jobs — who buried numerous personal and corporate hatchets to deal directly with Bill Gates — to make amends. Whatever the case, the proof is in the pudding — and Microsoft is serving up one rich pudding. If the miraculous rebirth of Internet Explorer from certified dog to prize pooch was not sufficient, the long-overdue Mac upgrade for Microsoft's crown jewel, Office 98, looks much better than the lamentable 1994 release. Unfortunate it may be, but Microsoft is essential to the Mac's survival since it is arguably the platform's foremost software developer.

Jobs has taken steps to revitalise the Mac games market too, an obvious fac-

tor in PC buying decisions that was for too long neglected around Cupertino. To cap off a near-perfect speech, the defiantly interim chief executive was able to announce a \$US45 million profit for the quarter; a small figure maybe, but endlessly significant to a company that has haemorrhaged red ink for over two years.

It might be the ultimate irony of Steve Jobs' return to Apple that a guy famous for big picture vision has become an operations hotshot. More seems to have been achieved inside these six months than in the previous couple of years, at least as far back as the PowerPC migration. Little wonder everyone wants Jobs to lead the company full-time. But the mercurial industry icon steadfastly protests that it is not what he wants.

Given that condition, what has Jobs proved? For one thing, he's shown that the company should abandon its evangelical, isolationist, almost cult-like culture. It needs good products and much, *much* better execution. This has never been truer than now, since Jobs — with his unique mix of leadership skills and personal networking — has cleaned up the product line and set a viable direction for the next year or two.

Some worry that Jobs' rescue efforts have scared away prospective talented candidates for the big office, but the prodigal founder performed a much needed commando role. Apple now needs an Eisenhower to lead an organised assault from the beachhead Jobs has established.

The company needs someone proven in business, respected internally, admired by peers and dynamic enough to motivate the faithful.

But as long as the ideal candidate is already serving, Apple can take its time finding a replacement. ■

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LGE047 APC

Buying a computer is an expensive exercise, yet every day people stroll into computer stores around Australia knowing little, if anything, about their multi-thousand-dollar purchase — like lambs to the slaughter.

Clone PCs

This month Price Watch looked at buying a desktop machine for a relatively computer-literate couple wanting to do some work from home. The machine would mainly be used for word processing, some presentations, the odd spreadsheet, a little surfing of the Web and, of course, game playing.

No matter what product you are purchasing, chances are that the first two questions you will be asked are 'What is your budget?' and 'What do you want to do with it?'. Our answer to the budget question was a non-committal, half-serious 'As little as possible', but the more important answer concerned what we wanted to do with our new PC. Because computers, particularly shop-built clones, come in every configuration imaginable, you need to be precise about this, as it basically sets the processor speed, memory requirements, peripherals and eventually the price.

While we restricted our enquiries to PC clone manufacturers, a handful of vendors were IBM resellers, and to give some indication of the price difference between

clones and genuine brand-name machines, both were included in this month's survey.

The most recommended processor was Intel's Pentium 200MHz MMX. The fact that it was a genuine Intel chip was surprising given that we were dealing mainly with clone manufacturers, which, as a group, often opts for the more cost-effective AMD K5/K6 or Cyrix 6x86 MX chips. Suggested RAM configurations in each new machine were consistent across the country, and 32M is becoming the default standard. Only Best Computers in Toowoomba, Queensland, offered less — just 16M of EDO RAM — but its overall system was obviously older than the rest: a P166MHz machine with a 14in monitor.

However, Best Computers didn't quite live up to its name. The salesperson who took our call knew nothing about computers and wouldn't put us through to someone who did. Instead she spent the conversation covering the mouthpiece and asking another salesperson questions. Neither knew the answer to several of our questions, including whether or not the modems sold were upgradable to 56Kbps.

When she finally faxed us a price list it was two months out of date.

Despite its questionable presales service, Best Computers offered a 3.2G hard disk even on its older system, which was much higher than the 2.1G most commonly recommended. Ironically, Sydney-based Action Computers offered a whopping 3.6G hard drive, but didn't actually bundle any software (other than Windows 95) to fill it. Thankfully, no supplier offered any less than a 24-speed CD-ROM drive, and only Best Computers offered a monitor smaller than 15in.

When it came to modems, however, the dealers really started to differ. 3D Com in Victoria only bundled a modem as an optional extra, while Internet access provider AFS included not only a modem but 33 hours of online time per month for the first six months. Dealers mainly recommended external NetComm and Banksia modems, or the cheaper KTX brand.

Most vendors let us down when it came to the two 56K modem standards. Many

Continued on page 58

Clone PCs

Company	Phone	Processor	RAM	Hard drive	Price
3D Com	(03) 9376 7722	P200 MMX	32M	2.1G	\$1,700
AFS	(03) 9576 8412	P200 MMX	32M	1.7G	\$2,000
Action Computer	(02) 9281 3988	P200 MMX	32M	3.6G	\$2,500
Approved Systems	(02) 6281 5344	IBM Aptiva P200	32M	2.1G	\$2,894
Best Computer Services	(07) 6327 732	P166 MMX	16M EDO	3.2G	\$1,995
Darwin Personal Computer Centre	(08) 8943 0678	IBM Aptiva P200 MMX	32M	2.1G	\$3,049
Micro Plus Solutions	(08) 8251 5400	233MHz MMX	32M	2.1G	\$3,189

If you've had just about enough of your Internet service provider, there is someone who will listen to your complaint. By Roulla Yiacoumi

The power of one

After APC's Service and Reliability column published a complaint letter about OzEmail at the end of last year, we were swamped with similar stories from users of other Internet service providers (ISPs).

There were tales of being incorrectly charged for usage, having credit cards erroneously debited, substantially delayed billing, the breaking of the initial contract by the ISP, unjustified price hikes, the abrupt and wrongful cancellation of an account, and poor customer service.

Many users cried unfair, saying that all the power sat in the hands of the ISP, while they had little control or influence over any decisions made by the provider. But this does not mean users forgo any rights to be treated fairly and properly.

Although ISPs are not governed by any organisation as such, there is a body which will help dissatisfied users resolve their ISP problems — the Telecommunications Industry Ombudsman (TIO). The TIO is an Australia-wide, independent organisation which provides a free service to resolve telecommunications complaints. As of July 1997, it became compulsory for all telecommunications carriers, including ISPs, to join the Ombudsman Scheme. This allows the TIO to monitor complaints and take them up directly with the carriers, which are required to comply with certain conditions of the scheme. There is, however, one catch: the TIO is an office of last resort. This means that you must first give your ISP a "reasonable opportunity" to resolve your complaint.

If you have repeatedly tried to settle a problem to no avail, then it's time to take action. The TIO can be contacted on 1800 062 058. This is a free call within Australia. Alternatively, you can write to APC's Service and Reliability column. Our contact details are below and we are always happy to receive your letters.

APC received the following complaint from a reader about his ISP:

Dear APC,
There are hundreds of thousands of individuals and business people who seek an Internet connection merely for an email facility. They

do not use the service for more than an hour or two per month. I am one of them.

I joined an ISP called Internet Information Superhighway (IIS) which boasted being "The World's No.1 Internet Company". IIS charged a \$25 membership fee. Then there was a choice of three plans: the monthly plan (\$40 per month, unlimited access, for 'private users only'); the gold plan (\$380 per year, unlimited access, for 'private users only') and the minute plan (five cents per minute or \$3 per hour).

After signing on as a minute plan user and, at considerable expense, printing all stationery with my IIS email account, the ISP then demanded a monthly payment of \$40. A letter sent to me by the ISP stated that it could "no longer offer access chargeable by the minute". There was no further explanation. I could choose to take up one of the other two plans or cancel the account in 21 days' time.

When I contacted the ISP and pointed out the unfairness of such a demand and requested that it at least refund the joining fee so that I could go to another provider, I was immediately disconnected from the server. I then could not access my mail arriving at IIS. I feel that is like the post office refusing to give me my mail.

The company ignored my fax requesting temporary access to my email. I now have to go through the trouble of reprinting my stationery and establishing an account with another provider, as well as having to advise all my contacts of the change.

I believe such unilateral power in the hands of ISPs is unfair and dangerous.

Captain Dick Gandy
Bilgola Plateau, NSW

APC contacted the ISP for a response. We also forwarded a number of questions to IIS. Why did you cancel this plan? Why were users given such short notice of the changes? Does the contract you have with users state you can cancel a plan (and thus the contract with the customer) at any time? How long have you been operating as an ISP? On what basis do you claim to be "The World's No.1 Internet Company"? And finally, is it true you withheld the mail of this reader after he raised a complaint? We requested that the ISP provide its response within seven days.

Shortly after sending our letter, we

received a letter from IIS stating: "We will consider what action, if any, we will take concerning the [above] issue in due course." The letter also stated that the company would not hesitate to institute legal proceedings against APC if necessary. The letter was signed by Nicholas Baltinos, the CEO of IIS, who said no further information would be provided until Dick Gandy had given his permission to have details about his account passed on to us.

The reader immediately sent his signed consent form to the company, which promptly provided us with the following letter:

Dear APC,
On 1 July, 1997, two email broadcasts were sent by our accounts department to our customers. One was to our private customers and another to our business customers. Both email messages foreshadowed the cessation of our 'minute plan' by

Continued on page 58



CONSUMER

Tell us all about it

Service & Reliability is APC's consumer column. We invite you to send details of your buying experiences to:

email complaints@acp.com.au
fax Service & Reliability at
(02) 9264 6320
mail Service & Reliability,
Australian Personal Computer,
Level 8, 54 Park St, Sydney
NSW 1028.

Please keep your letters to no more than 300 words. All letters must contain a full name, address and contact phone number.

APC reserves the right to edit any submitted material for length and clarity.

We can publish only a selection of letters each month and regret that letters cannot be answered personally.

Get lost

...in cyberspace



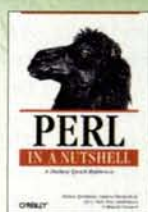
Microsoft Windows 98 Official Preview Kit
Borland
A valuable, hands-on overview of the newest version of the Windows operating system, including an on-line tour of what's new on the accompanying CD.

\$49⁹⁵ PB & CD



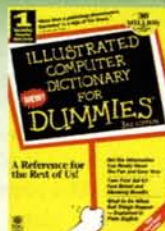
Learning the Unix Operating System (4th Ed)
Peek
If you are new to UNIX, this concise introduction will show you what you need to get started. Ideal for Mac and PC Internet users who need to know a bit about UNIX on the systems they visit.

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Perl In A Nutshell
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The perfect companion for programmers with all the core features of the language and a wealth of information about popular Perl libraries, online Perl resources, the use of Perl in CGI scripts and much more. An indispensable companion.

\$39⁹⁵ PB



Illustrated Computer Dictionary for Dummies (3rd Ed)
Gookin
The only dictionary you will need to understand all those confusing computer-related terms. The only book of its kind that adds fun to defining over 2000 terms, including new ones on the Web.

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Office 97 One Step At A Time
Stevenson
A step-by-step book to help you quickly build the skills you need. Work through the exercises and you will have a complete portfolio of Office 97 presentations, databases, spreadsheets and more. The CD offers choices to match your learning style and the interactive software talks you through procedures.

\$59⁹⁵ PB & CD



Hot Wired Style - Principles For Building Smart Web Sites
Jeffrey Veen
The elements of style with attitude for the Web, brought to you by the creators of *HotWired*, the premier Web site. *HotWired Style* sets the standards for successful Web design with award-winning, cutting-edge know-how.

\$59⁹⁵ HC & CD



Excel 97 One Step At A Time
Neibauer
This book provides clear steps for using the exciting new intranet capabilities of Excel 97, such as making the most of Intellimouse and customising Excel for your specific needs. The interactive CD lets you work with features in the software itself as it talks you through procedures.

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Office 97 Answers!
Martin Matthews & Carole Boggs Matthews
Office 97 offers significant improvements, which are sure to bring loads of new user questions on everything from installation to Web integration. This book answers hundreds of these questions in an easy-to-find format.

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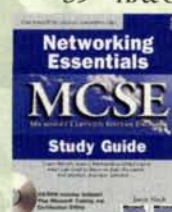
Word 97 One Step At A Time
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For the Word 97 user who wants a results-oriented approach to using all the power in this application, this book presents the skills necessary to become certified as a Proficient User in the Microsoft Office End-User Certification program. The CD's award-winning, interactive software teaches you the correct actions.

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DYMOCKS
BOOKSELLERS

Continued from page 56

November 1, 1997. The broadcast to business customers in part stated the following:

... In view of the decision to cease provision of service chargeable by the minute, you will have essentially three choices.

- 1. Convert to our Monthly Plan;**
- 2. Convert to our Platinum Plan; or**
- 3. Request termination of service**

... A reminder will be forwarded to you in October 1997 inviting you to elect an option ... We appreciate that business customers incur expense in promoting their email address via a variety of mediums. To this end and in the event you elect option three, we will provide to you, at no cost, a permanent redirection

to your new email address or you may wish to retain your address with us and access our mail server via your new provider if you so wish."

The broadcast to personal users offered permanent redirection and/or an open email service together with electing an appropriate option.

An assertion which we strongly refute is that Dick Gandy's account was immediately disconnected from the server. At no time has Dick Gandy's service been suspended. The account remains active to this day and until October 31, 1997.

Internet Information Superhighway is proud of the service it delivers to its customers. It is regrettable that Dick Gandy has responded adversely

to a commercial decision made by this company. We must point out that no other customer, private or business, has objected to this commercial decision.

If Dick Gandy's only use is for email, as he implies in his letter to APC, then the matter is easily resolved by exercising the option to retain his email address pursuant to our email broadcast of July 1, 1997. All that is then left for Dick Gandy to do is to establish an account with [another] ISP for the purpose of dialling into the Internet then set his 'email client' to interrogate our mail server utilising his username and password. His mail facility will function as if he never left us.

Internet Information Superhighway

Clone PCs

Continued from page 55

couldn't tell us which 56K modem standard (Rockwell's K56Flex standard or 3Com/US Robotics' X2) they stocked. However, the salesperson from Micro Plus in South Australia not only explained the existence of the two standards but also the complexities of actually acquiring 56K and the importance of the modem being upgradable to the new standard when it was finally settled.

Other peripherals were standard: all systems came with soundcards (the SoundBlaster Vibra 16 being the most popular) and video cards. Only the two Victorian companies, 3D Com and AFS, didn't offer printers. Surprisingly, those that did bundle them opted for brands such as Kyocera, Lexmark and OKI rather than Hewlett-Packard.

When you are shopping around for a PC, don't forget to find out what post-sales service the company offers and whether or not the warranty requires you take (or ship) the equipment back if it needs repairing. Most vendors offered between one and three years' parts-and-labour warranties, the two IBM resellers, Approved Systems and Darwin Personal Computer Centre, naturally having the most thorough IBM-backed help available. While customers can be sure that IBM will be around in two years, sadly the same cannot be said for the smaller companies, so be sure that the vendor you choose is reputable. If it looks even slightly shonky, walk right out. The same can be said for poor customer service. If the salespeople try to intimidate you with tech-

Our charter and method

Price Watch is an exercise in comparative technologies, relative prices and human nature. All investigations are conducted anonymously, and records are kept of conversations. Prices and system capabilities printed here are provided by the sales staff at the offices we contacted, and all information is as supplied. While we assume that these are correct, we cannot accept any responsibility for errors or omissions. Neither will we be held to account by companies mentioned here for omissions to product ranges or system capabilities. The responsibility rests with sales staff to provide adequate information, as the company would expect them to do with every customer.

nobabble or make you feel uncomfortable, just leave.

There is no point buying a fabulous new computer if you don't have any software to run on it. Price Watch was very disappointed that most vendors only offered Windows 95. The genuine IBM PCs came with a plethora of software and AFS's bundle was also quite decent, but every other dealer charged several hundred dollars for software bundles.

Be wary if your new computer comes filled with hundreds of megabytes of games and applications and you aren't given any manuals, CD-ROMs or licences. This could be a sign that the vendor is supplying illegal copies of software — a prevalent problem among less reputable vendors.

Every vendor except Alanda Systems in

Sydney returned our calls or faxed quotes, but the detail of each quote sheet varied immensely. After you've been shopping around for a while, all the computers are going to start sounding the same, so be sure to ask for detailed quotes that specify brand names. The IBM resellers and Micro Plus Solutions provided exceptionally thorough quotes, whereas several other vendors gave quotes that could be taken to mean they used all no-name parts.

Remember to not always judge a computer by its price and try to avoid comparing two computers this way. As you can see from the table, prices (and computer components) vary immensely. Never be afraid to ask questions. Price Watch was often fed remarkably incorrect or incomplete answers that were only uncovered after probing.

An example of the need to ask questions was our call to Canberra's Approved Systems. The salesperson reluctantly gave details only if asked about something specific. However, his service turned out to be the most impressive as he patiently explained the difference in processor speeds and what each component did. And, when faxing through a quote sheet, he even went to the trouble of including explanations of the P2 chip and various other tidbits that we had shown interest in from Intel's Web page.

Finally, consider that if you only want a computer to do simple tasks like word processing or learning the basic computing survival skills, there is absolutely no need to buy a brand-new, whizz-bang computer. You might be happier (and certainly better off financially) purchasing a slightly older, second-hand machine. ■

Get lost

...in the future



MCSE TCP/IP Study Guide
Greg Bulette
The most thorough and comprehensive resource for TCP/IP and Systems Management Server-related MCSE course with all you need to pass these exams, plus a CD and a full version of Microsoft Internet Explorer.

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Contains six great software applications to boost office productivity.

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Visual Basic 5 Developer's Handbook
Petroutsos & Hough
A hard-core book for the experienced Visual Basic programmer, with advanced chapters on internet connectivity. Extend your skills by focusing on significant advances in Visual Basic 5, including Internet.

\$89⁹⁵ PB & CD



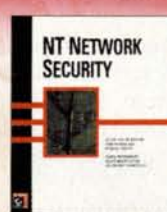
Windows NT 4 Complete
Mark Minasi
This best-seller was first to explain how to make NT work in an enterprise network. The latest edition shows how to use powerful built-in applications and utilities for networking, control, scheduling and comms applications.

\$159⁹⁵ PB & CD



Illustrator 7 Wow!
Sharon Steuer
The definitive step-by-step guide, updated, revised and expanded for Illustrator 7.0.1, has a new Web, Multimedia and Animation chapter, and a free Mac and Windows CD with special free clip art and fonts.

\$59⁹⁵ PB & CD



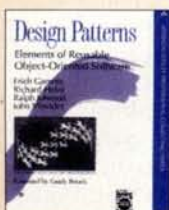
NT Network Security
Strebe, Perkins & Moncur
A complete, practical guide to assessing network security and implementing effective solutions. Includes a CD with tools for securing NT network and case studies on security implementation.

\$99⁹⁵ PB & CD



The C++ Programming Language
Bjarne Stroustrup
Written by its inventor, this is the definitive text on C++. This book does far more than simply describe the language, its emphasis is on the use of C++ as a powerful tool for design and programming.

\$62⁹⁵ PB



Design Patterns
Gamma et al
Capturing a wealth of experience about design of object-oriented software, four top-notch designers present simple and succinct solutions to common design problems.

\$52⁹⁵ HC



Windows NT Training Guide
James Turley
The package covers all the details of Windows NT functions and functionality to get both new administrators and users of the operating system proficient in no time!

\$79⁹⁵ PB



Photoshop Answers!
David Busch
The author's experience in both computer photo manipulation and traditional photography delivers readers with a knowledge base covering all related topics for both PC and Mac versions.

\$44⁹⁵ PB



Unix & Linux Answers!
Charlie Russel & Sharon Crawford
Unix is the leading operating system for Internet and World Wide Web servers and the book includes "how to" lists as well as a command reference appendix and glossary.

\$44⁹⁵ PB



Lotus Notes and Domino 4.5 Answers!
Polly Russell Komblin
This book will focus on the new web functionality of Domino 4.5 as well as the improved E-mail, group discussion and workflow features of Notes.

\$44⁹⁵ PB



Learn ActiveX Development
Nathan Wallace
Detailed examples to move developers into Microsoft ActiveX. Contains core programming examples with source code, detailed explanations and step-by-step instructions.

\$94⁹⁵ PB



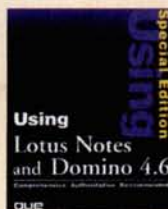
CorelDraw 8: The Official Guide
Foster D Coburn III, Peter McCormick
Step-by-step tutorials that teach exactly how to use and implement CorelDraw 8 and its powerful features, as well as how to start and complete a variety of projects.

\$64⁹⁵ PB



Special Edition Using HTML 4 (4th Edition)
Jerry Honeycutt, Mark R Brown
Gives real-world advice for designing Web sites, creating graphics and using multimedia on your Web site.

\$89⁹⁵ PB



Special Edition Using Lotus Notes & Domino 4.6
Cate Richards
This book covers every facet of the Notes and Domino environments, focusing on the features and tools that help the power-user accomplish tasks efficiently.

\$89⁹⁵ HC

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DYMOCKS
BOOKSELLERS

Fixing the year 2000 bug means an immovable deadline, which may be sooner than you think.

Have you missed the millennium?

The mood among those responsible for rescuing businesses from the Millennium bug is that if you haven't started yet, you're running late for the year 2000.

It is generally accepted that by December this year most systems will be encountering a high number of post-2000 dates among deadlines, expiry dates and so on. Many organisations are already running into the consequences of non-compliant software, finding that tasks cannot be completed or products cannot be issued as normal. Consider the consequences: where software determines age by subtracting year of birth from the current year, a system which can only handle two-digit dates will decide that in the year 2001 (01) a person born in 1970 (70) will be aged -69. An invoice generated in 1999 (99) due for settlement in 2000 (00) would be interpreted as being 99 years overdue.

US author Gary North, Y2K's greatest doomsayer, calls it "the biggest problem that the modern world has ever faced". Due to a global lack of experts and resources to adequately fix the problem, he predicts that all the clichés of aeroplanes falling from the sky and stock markets crashing will become reality. Others predict that the Y2K problem will hit hardest in Asia, which has been slow to recognise it and lacks repair funding.

Fortunately, we've been getting somewhere over the past couple of years. Ian Stewart, CEO of Quality Software Products (QSP), believes the focus has changed. "Many large companies worldwide would appear to have already addressed the software problems," he said. "The wider issue is more hardware related, [in areas] not typically associated with computer chips, such as elevators, cars and so on."

Roger Corbett, managing director of retail for Woolworths Australia, has taken a direct interest in ensuring his diversified organisation is prepared. "The longer it's left, the more expensive it becomes, as resources grow scarcer and the time window begins to close," he said in a speech to the Retail Traders Association. "The

solution is not difficult, however it is the number of times that the solution must be applied that is the real challenge."

The Woolworths organisation includes Big W, whose year 2000 project manager, Penny Winn, says her major role these days is working with smaller organisations further up the production chain to minimise the impact of their Y2K problems on the retailer.

The company itself took early action. Its first step was to identify the magnitude of the problem and the earliest date impacts. Then it worked with Unisys to

renewed as compliant; this way, legal responsibilities are passed to the supplier.

Another solution for third-party software is to figure out a workaround. For example, an entry in an extra field might be used to distinguish post-2000 items from older ones. If your workaround is to be your permanent solution, Winn warns that extra-vigorous testing will be critical for total confidence.

A recent Coopers & Lybrand survey of 300 corporate and public sector entities found that fixing the Y2K problem in this country will cost around \$10 billion.

Some say the problem is simply too broad and expensive for disaster to be avoided, and legal firms see potential liability issues as a major opportunity.

But DMR Consulting Group argues in its white paper *Snatching Victory from the Jaws of the Year 2000 Beast* that a positive return on Y2K repair spending is possible through the continuing benefits of enhanced IT capabilities. While this is a good point, suppliers have a vested interest in pushing it as a solution, and as Winn points out, this is a very late and risky stage to be making such major changes.

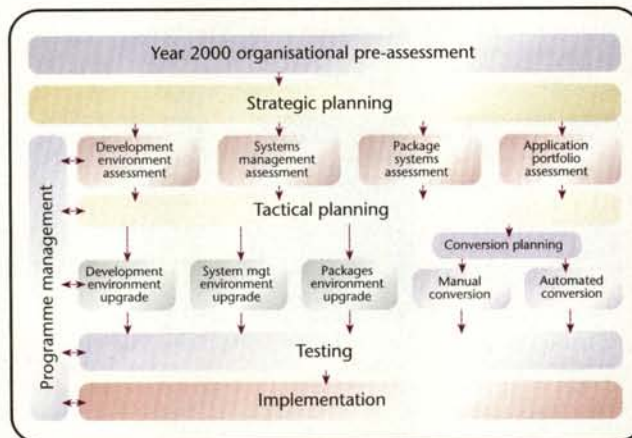
In the long run it could also be a problem for suppliers that are geared towards issuing new versions every 18 months, as firms will either have undertaken dramatic upgrades already, or will be sticking with what they know is safe.

"I don't believe any company is going to be implementing an upgrade of anything in the third quarter of 1999," said QSP's Stewart. "Our customers wouldn't thank us for bringing out a new version in 1999, in fact they'd just ignore us."

Is anyone immune from the bug? Somewhat bizarrely Apple computers can all handle dates from January 1, 1904, to June 2, 2040; so users have a few decades' breathing space. There are other exceptions, but various software packages may treat the problem in different ways on the same platform — testing is the answer.

Simon Vandore and Helen Dancer

A list of contact details for companies mentioned in this article appears on apcmag.com.



renovate the code involved. "The third, fourth, fifth, sixth and seventh steps," said Corbett, "are test, test, test, test and test."

"There are always problems coming up," said Winn. "No matter how much testing you do, there will continue to be problems all the way to the year 2000."

It's important to stress that testing may not require serious interruptions to daily operations. Some automated testing suites are available, and there are a couple of new tools on the market which can actually help alter code (tailored to different levels of IT, such as Execom's FixIT 2000 and MFX Research's Millennium Master).

It's not just inhouse code that needs fixing — Big W also used some third-party software, which it had to replace or upgrade in favour of guaranteed Y2K-compliant products. The entire Woolworths organisation is requiring all software and hardware it buys to be war-

Get lost

...in creativity



Red Hat Linux Unleashed (2nd Edition)
David Pitts, David Hornath
This book takes the reader through installation and configuration to advanced programming and administering/ networking the system.

\$69⁹⁵ PB



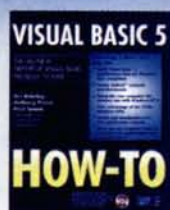
Dynamic Web Publishing Unleashed
Michael Moncur, Brian Croft
Provides thorough coverage of advanced Web publishing technologies, including HTML, Java, CGI, VBScript and JavaScript.

\$89⁹⁵ PB



Game Programming Starter Kit (Version 2)
SSI
Gives you everything you need to create your own exciting 32-bit Windows 95 games.

\$69⁹⁵ PB



Visual Basic 5 How-To
Eric Brierly, Paul Sanna, Anthony Prince
This book shows how to build Automation Servers and ActiveX controls to create component objects and give applications access to custom functions and methods.

\$84⁹⁵ PB



Redefining Design
Besmer, Lytle & Wade
Provides the reader with an overview of the changes that are taking place in the design, ad and digital media industries and explains how to take full advantage of them.

\$79⁹⁵ PB



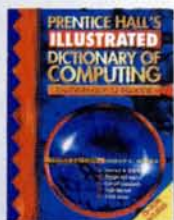
3D Studio Max 2 Fundamentals
Michael Todd Peterson
Covers all the essentials of 3D design from building basic objects, adding textures and lighting to placing cameras and rendering basic animation.

\$79⁹⁵ PB



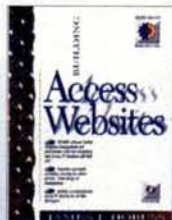
MCSE Training Guide: TCP/IP
New Riders Development Group
Provides users with all the information they need to pass this MCSE elective exam.

\$119⁹⁵ HC



Prentice Hall's Illustrated Dictionary of Computing (3rd Edition)
Jonar C Nader
A Style Manual and hundreds of illustrations teach both experts and beginners about the products, events and people who shaped the world.

\$49⁹⁵ PB & CD



Building Access Websites
James J Hobuss
Explains how to incorporate a database into an existing site, and covers all server platforms as they relate to Access.

\$59⁹⁵ PB



Time Bomb 2000
Edward & Jennifer Yourdon
Describes how the Year 2000 problem can potentially affect all facets of your life if it is not properly addressed.

\$19⁹⁵ PB



The Complete Australian Guide to Buying & Upgrading PCs
Stephen O'Brien
Shows you how to buy and upgrade your computer, explaining terms such as bits and bytes, memory, hard drives, multimedia, modems and more.

\$39⁹⁵ PB



Upgrading & Repairing PCs (8th Edition)
Scott Mueller
Covers all new technologies while still providing the reference and background information to allow new readers to catch up with the current state of the hardware industry.

\$99⁹⁵ PB



Windows NT Server Training Guide
Todd Foley
This book and CD package is for users new to Windows NT, who wish to utilise its powerful capabilities and become proficient Windows NT administrators.

\$95⁰⁰ PB & CD



Effective E-mail Clearly Explained
Bradley Shimmie
The hands-on advice plus tools needed to make E-mail enjoyable and productive; send and receive file attachments, search for addresses and work with different systems.

\$69⁹⁵ PB



Java Training Guide
Steve Heller
This guide teaches the basics of Java while also pointing out problems and complications with the language that you may encounter. The CD features over 120 minutes of interactive training movies divided into convenient session modules.

\$79⁹⁵ PB



Netscape Communicator
Bryan Pfaffenberger
With the Communicator software suite, you can go beyond just browsing the Web. This book gives you the knowledge needed to master the many components of Netscape Communicator and includes a concise overview.

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DYMOCKS
BOOKSELLERS

New off-the-shelf payroll packages can help take the pain out of payroll administration.

Payroll: The better way

A great number of small businesses use some kind of computerised accounting system. When it comes to paying employees, however, an equally large number use old entry books, or have someone who comes in once a week to calculate wages, or do a bodgie job using the existing accounting system — which probably wasn't designed for payroll at all.

A better approach to the issue is to make use of one of the specialist payroll packages that are now entering the market, at prices not too big for the SOHO pocket. While this may seem rather a waste of effort — especially if your company only has a few employees, or is a consulting organisation with merely a couple of directors — there is still much to recommend investing in a computerised payroll program.

The advantage to taking the full-on approach may not be evident at first, when the power and complexity of the package may seem too much for simply dealing with a few employees. However,

as the business expands, adds staff, sets up its own super scheme or takes on subcontractors, the standard 'cut and paste from the accounting package' approach will usually prove increasingly hard work. And changing to another dedicated sys-

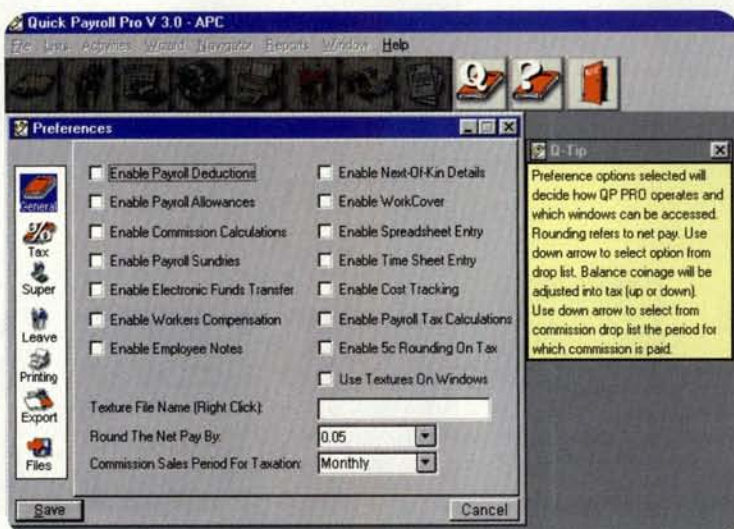
worth the investment almost for this aspect alone.

Setting up most payroll packages is fairly well automated. Quick Payroll offers a dedicated set-up wizard, which runs the new user through a preconfigured series of questions including bank account details, super fund information and so on. Once this has been done, the user then needs to enter details of each employee, their rate of pay and their job category. Extra details, including sick leave entitlements and holiday loading, can be included in the employee data fields to automate these otherwise tricky calculation details. There is a useful, if somewhat sobering, field for the next of kin, right next to the workers compensation details, as well as the option to enter actual details of any accidents that occur.

Many packages of this kind can also create a specific EFT transfer authorisation for your bank, if it supports this kind of facility. This means you can do away with all those little packets and envelopes, and simply advise employees of their pay and give them payslips to confirm transfer of funds into their account. In addition, many payroll packages include the ability to use barcode swiping as an alternative to the old time clock systems. This allows direct input of start and finish times into the system, which can then calculate the hours worked at a given rate. Most payroll programs will also allow the accurate accrual of holiday allowances, which can sometimes be a real bone of contention between workers and employers.

Whatever the reasons for opting for an off-the-shelf payroll package, you can be sure it beats the old ledger book system, and it is much easier to set up than a specially developed payroll suite sitting on top of Excel or 1-2-3. It will also save you from the attendant ongoing maintenance of either option.

Jeremy Torr



tem at that later and more complex stage will involve much bigger headaches than starting from scratch with a specialist payroll setup.

One package of this kind is Quick Payroll Pro, from the makers of the ubiquitous Quicken and QuickBooks. Although Payroll Pro will work perfectly well in conjunction with either of these packages, it's aimed more at the QuickBooks user. In fact, distributor Reckon is bundling it with QuickBooks, for \$599. Although Payroll Pro will happily exchange data with Quicken, QuickBooks has a greater range of facilities. So, although it's much more expensive, most users would probably be better advised to opt for the full package.

However, the advantages of a PC-based payroll system don't end with the ability to swap information with your existing accounting package. Complicated tasks such as accounting for varying levels of tax and super for different employees can be dealt with automatically; as can the production of group certificate information and overall income and expenditure at the end of the year. These programs are

Payroll applications

- **Quick Payroll Pro \$399**
Reckon Software (02) 9562 7900
<http://www.reckon.com.au>
- **Winpay \$495**
Datascope (03) 9528 1755
<http://www.winpay.com.au>
- **PayBook \$295**
Logisoft (07) 3379 1200
<http://www.logisoft.com.au>
- **KwikPay \$199**
KwikPay (07) 3886 7661
<http://www.kwikpay.com.au>

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ClarisWorks 5.0

Jesse Feiler

A practical guide to the newest version of ClarisWorks. The first part teaches you how to get the most out of the new additions, the second discusses the new technology from a practical point of view.

\$59⁹⁵ PB



WordPerfect 8 Answers!

Bob Bringham

Compiled from questions the author received as a columnist for WordPerfect for Windows magazine, this book gives you answers quickly and includes technical support Q&A from WordPerfect's development team.

\$44⁹⁵ PB



Windows 95 Answers!

This handy reference is packed with hundreds of easy to find answers to the most common questions asked of technical support regarding what's new, interesting and confusing in Windows 95.

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Windows NT 4 Answers!

Barrie Sosinsky

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\$44⁹⁵ PB & CD



Internet & Web Answers!

Cheryl Kirk

This book provides the answers to the most commonly asked technical support questions and has been developed with Stream International, the world's largest third party support organisation.

\$44⁹⁵ PB & CD



Access 97 Answers!

Edward Jones & Jarel M Jones

Another title in the incredibly successful Answers series written by an expert in the field and answering all the most commonly asked questions plus many more.

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Learn Advanced Internet Relay Chat

This book provides an intermediate to advanced treatment of the popular interactive, multichannel communications feature of the Internet, as well as Bots, Scripts and DCC not found in other books.

\$56⁹⁵ PB



MCSD Visual Basic 5 Exam Guide

Productivity Point International

Provides a complete training kit for those studying to pass the MCSD Visual Basic 5.0 test (test 70-165).

\$99⁹⁵ HC & CD



Complete Idiot's Guide To Creating an HTML 4 Web Page

Paul McFedries

Provides users with the tools they need to create and customise their web page.

\$29⁹⁵ PB



Netscape Communicator for Busy People

In-depth coverage and step-by-step instructions on using Netscape Communicator 4.0: browsing, E-mail, newsgroups, publishing, conferencing and netcasting.

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C/C++ Programmer's Pocket Reference

The most up to date functions, keywords and expert tips as well as examples of when and why to use various syntax - perfect handy reference for both new and experienced programmers.

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Microsoft Office 97 Professional 6-in-1

Offers integrated support to all the components of MS Office Professional Edition and Windows 98.

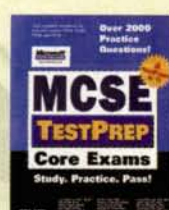
\$49⁹⁵ PB & CD



Corel Photo-Paint 8: The Official Guide

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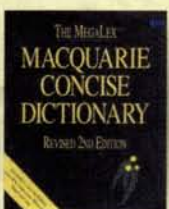
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DYMOCKS
BOOKSELLERS

*The third in the series of reports
into use of the family PC.*

How do kids spend their time?

In December I reported on the numbers of boys and girls who use a computer in their homes for game-playing and educational use. In this report I concentrate on how much time they spend doing it. The good news is that the media hype about a generation of computer addicts is not founded in fact.

Three national studies, the Australian Bureau of Statistics (ABS, 1996), the Australian Broadcasting Authority (ABA, 1996) and my own study (Downes, 1997), investigated patterns of the average weekly time household members spent on different computer activities. The ABA also collected data on other leisure activities such as watching television or playing sport.

The ABS data revealed that the large majority of young people spent between zero and five hours a week playing games. Even for males in the age range 10 to 17 — the group identified in popular media as the enthusiasts and addicts — the ABS found that fewer than 10% played games for more than 10 hours a week. While this may seem a long time, it is important to remember that the average time this age group spent watching TV exceeded 18 hours a week.

When looking at a broad range of leisure activities the ABA study data found that children and teenagers spend their leisure time on many different activities, the dominant one being watching TV. Interestingly, when homework was excluded from the list of activities, these young people spent more time on electronic leisure activities (55%) than on other activities (45%). Not surprisingly, the non-electronic activities took up more time on weekends (54%), while on weekdays electronic leisure activities predominated (64%).

Boys and girls had different ways of spending their time. Boys spent more time on TV, sport and electronic games, and girls spent more time on reading, listening to music, drawing and writing. Again, gender differences emerged. Boys reported

that when they were on their own, they preferred to play video and computer games, after watching TV; while girls' second preference was listening to music. On the other hand, when they were with friends, both boys' and girls' overall preference was for non-electronic activities. Of the preferred electronic activities, boys

The majority of children and teenagers used the computer for non-game-playing activities on average for one to five hours per week. Gender differences regarding time spent on non-game activities were reversed in the sense that girls spent more time than boys using the computer for non-game-playing activities.

Not surprisingly, the amount of time spent on educational and study-related activity increased with age, peaking in the 15 to 18-year group. In this age group, more boys and girls spent more time using the computer; however, even in this group, time spent on homework away from the computer far outweighed time spent on the computer. In all children's lives, homework is still basically a book and paper-based activity.

My study found that when children did use the computer for educational and study-related purposes, they spent most of their time

either looking up information or writing essays, reports and doing projects. Lengthy discussions with 8 to 12-year-olds revealed that when looking up information they spend as much time browsing in the hope of finding some interesting information as they do using particular search strategies. While on the surface this may seem a waste of time, it does provide an opportunity for children to 'see' the surrounding information and better understand the context from which they are taking their bits of information. Similarly, when they are writing up reports and projects many children spend much or more of their time tinkering with the 'look' of their writing than concentrating on the what they are trying to say. Boys and girls cared about the appearance of their work and enjoyed the time they spent making it just right.

Toni Downes

Toni Downes is Associate Dean of Education at the University of Western Sydney, Macarthur.

Proportion of time spent on various leisure activities

Hanging around	5%
Playing sport	8%
General play	10%
Going places	11%
Homework	11%
Videos	4%
Electronic games	5%
Listening to music	7%
Television	33%
Reading	4%
Other	2%



again chose playing electronic games while girls preferred going to the movies.

While these patterns do clearly indicate that boys spend more time with electronic games than girls, generally their use is balanced by a wide range of other activities which take up by far the majority of their leisure time. In my study, many boys and girls went to great lengths to describe how busy they were after school with a wide range of sporting and cultural activities, and even when they were at home, there were often rules that restricted the time they could spend playing computer games. Rules included how long and how often they could play. There were no such rules relating to using the computer for non-game-playing activities. In fact, in homes where the computer was in demand, family members wanting to do work and study on the computer had priority over children who wanted to play games. In many homes this provided an opportunity for girls to claim time at the computer, because as educational users, they were able to displace their game-playing brothers at the screen.

The first two articles in this series appeared in APC November and December (both on page 72).

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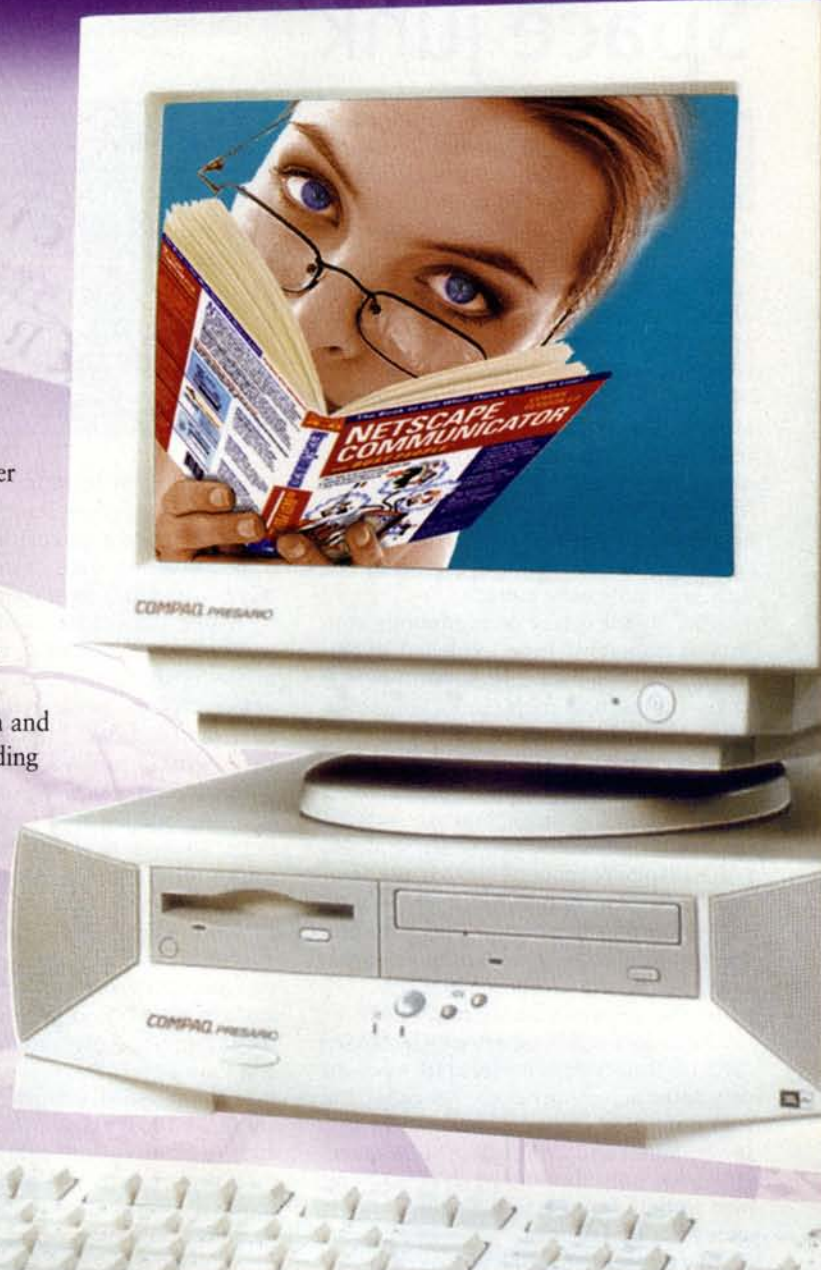
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2. Entry is open to all Australian residents other than employees of and their immediate families of Compaq and the promoter.
3. The prize is a Compaq Presario 2240 desktop computer. Computer package includes 200MHz AMD-K6™ MMX™ Enhanced Processor, 32MB SyncDRAM expandable to 80MB; 55Kbps data/fax modem (K56flex protocol is designed only to allow faster downloads from K56flex compliant digital source. Maximum achievable download transmission rates currently do not reach 56Kbps, and will vary with line conditions.); 2.1 GB hard drive; 20X Max CD-ROM drive (data transfer rates may vary from 1300 to 3000Kbps); 3.5" 1.44MB diskette drive; V410 14" colour monitor (13.2" viewable image area); Compaq

- keyboard. Software – Microsoft Windows 95, Microsoft Internet Explorer 4.0, Compaq Internet set-up, Microsoft Works 4.0a, Quicken Standard (v6.0), Microsoft Encarta 98, Moto Racer, Microsoft Soccer. Retail value (inc tax) of prize is \$2,299.
4. The prize is not transferable nor redeemable for cash.
5. The winner will be judged at the Dymocks Head Office – 6th Floor, 428 George Street, Sydney – on Monday 06 April 1998 at 4pm.
6. The most creative entry will be the winner.
7. The judges decision is final, and no correspondence shall be entered into.
8. All entries must be on an original coupon.
9. The winner will be advised by mail.
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DYMOCKS
BOOKSELLERS

Litter in space is on the increase and is already causing problems for spacecraft.

Space junk

Spacecraft have been launched since the 1950s without regard for the debris created each time this happens, and it is feared that collisions with junk will become more frequent if our throw-away behaviour in space is not changed. Collisions have already taken place: it was reported in 1996 that a French satellite was destroyed when hit by a discarded rocket stage.

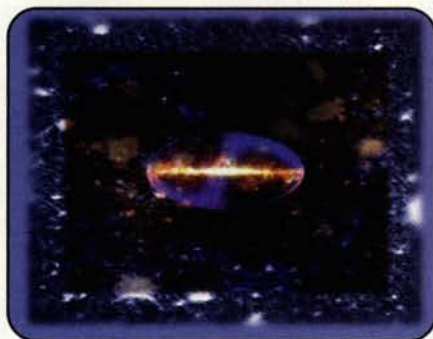
There are about 3,600 satellites in orbit, and with schemes such as Teledesic, Iridium and Celestri set to roll, it is predicted that there will be another 1,000 launched within the next three years. Most of these will be low earth orbit (LEO) satellites, and it is in this orbit that the junk is already most dense.

This orbital debris predominantly consists of fragments from exploded upper-stage rocket bodies and satellites. It is unknown just how many small objects are orbiting Earth, but there are more than 8,500 objects the size of a tennis ball or bigger. NASA's Orbital Debris Research Project believes that there are millions of objects the size of a pellet orbiting the planet, whizzing past each other at about 35,000km per hour. Not only is there the potential for them to hit each other and create more mess, but also the risk that they may harm manned spacecraft or expensive satellite equipment.

In the second quarter of 1997 three satellite break-ups were detected by NASA. Two of the events generated over 70 detectable bits of junk each. The other, the well publicised collision between the Mir space station and the Progress M-34 spacecraft, not only threatened lives and created serious damage to the craft, but also created orbital debris.

In space, with objects travelling at speeds such as 9km per second, even small specks of paint can cause considerable damage if they collide with something else. Orbital debris has been recognised as an international problem, and it will require more attention as the number of spacecraft increases.

In a recent backgrounder to orbital debris, NASA said it was an issue of growing concern: "In the past, explosions have been the primary source of debris and are likely to continue to be so for the immediate future. However, current modelling indicates that even if there is no increase in



the number of launches per year and spacecraft and upper stages continue to be left in orbit at the end of their mission, collisions between large objects will eventually become the major source of debris."

It said that if the debris environment was not controlled, there was a great risk of the onset of collisions between large objects. "Once collisions begin to occur, it may be difficult to halt the process, and they will occur with increasing frequency," said NASA. Also, it said, the energies in collisional break-up are much larger than in explosive break-up, in the megajoule (a few kilograms of TNT) to gigajoule (a few tonnes of TNT) range. "At these energies, debris less than 1mm in diameter, typically about 1mg of mass, can penetrate an unshielded spacecraft surface and damage sensitive surfaces such as optics or thermal radiators; debris less than 1cm (1gm) can penetrate even a heavily shielded surface; and debris as small as 10cm (1kg) can cause a spacecraft to break up into debris fragments."

It is obviously in a company's interest to ensure its satellites or craft are not hit, so more attention is being placed on minimising space junk in future launches by taking such measures as deorbiting rocket stages, tethering 'bits' to the satellite, and causing satellites to deorbit and burn up in the atmosphere before becoming an earth-bound problem.

The United Nations Committee on Peaceful Uses of Outer Space is in the midst of a three-year work plan on the problem of space debris. Its Scientific and Technical Subcommittee has released a preliminary technical report on the measurement of debris, and will next examine methods of modelling debris, as well as mitigation issues.

NASA also has released a set of guide-

lines in an attempt to control the generation of orbital debris. The guidelines attempt to limit the generation of debris, assess the risk of collision with existing debris and assess the potential of objects to impact the earth's surface. According to the document, to satisfy the guidelines, the program or project manager should plan for the following: depleting onboard energy sources after completion of mission; limiting orbit lifetime after mission completion to 25 years or manoeuvring to a disposal orbit; limiting the generation of debris associated with normal space operations; limiting the consequences of impact with existing orbital debris or meteoroids; and limiting the risk from space system components surviving re-entry as a result of post-mission disposal.

Despite all of NASA's efforts so far, a recent report that it commissioned has recommended NASA undertake a thorough risk assessment to determine whether its shuttle could be damaged by space junk. *Protecting the Space Shuttle From Meteoroids and Orbital Debris*, by the National Research Council, also said the craft should be re-examined to identify components that may need additional protection.

It said that debris as small as 5mm in diameter could punch a hole through the wall of the crew's cabin and cause loss of air pressure. "NASA routinely moves the shuttle out of the path of debris large enough to be tracked by ground-based sensors operated by the Department of Defense (DOD)," said the report. "However, estimates indicate that more than 95% of debris that could critically damage the shuttle is too small to be picked up by current sensors."

Damage can also occur via natural means, such as meteoroids and geomagnetic storms. The latter, including solar flares, solar wind and coronal mass ejections, can affect equipment in space, as well as ground-based electronic devices.

Space weather forecasting techniques — which are about 50 years behind those of earth meteorology — are being developed through programs such as the US National Space Weather Program to predict potentially damaging conditions. The Space Environment Center provides daily updates on space weather at <http://www.sel.noaa.gov/today.html>.

Selina Mitchell

Millennium

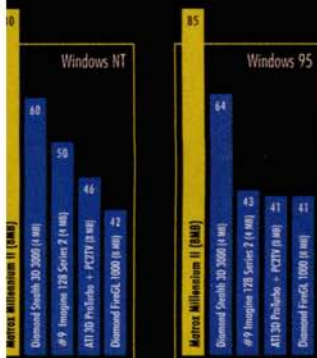
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For just how much longer will we see non-commercial activity on the Internet? Geert Lovink is fighting for the right to keep it independent.

By Selina Mitchell

Defending the public sphere

Being a media activist is not easy in the 1990s. First you need experience in obtaining funds for and setting up alternatives to traditional media, such as community television and independent newspapers. You also require knowledge on that vast and ever-changing tool, the Internet, to take advantage of its persuasive and community-creating potential.

And occasionally there are those damned media interviews to do. After trying to meet up with Geert Lovink on several pre-arranged occasions only to have each effort thwarted, I was beginning to think he preferred playing the role of interviewer rather than interviewee.

When we did finally meet, he always thought carefully before saying anything, not just because English is his second language, but also because he is aware of the media's power and its potential for misinterpretation.

From his base in Amsterdam, Lovink has set up pirate radio stations and alternative Internet sites across Europe and admits their content has not always been entirely legal; however, he can't be dismissed as a left-wing 'conspirator'. He is sensible and gently spoken, an intellectual, although he would probably despise being described so.

Behind Lovink's actions is the belief that technology and media shape the substance and structure of our lives. This situation provides the non-commercial organisations with which he is involved with a great opportunity for launching creative, collaborative endeavours to increase public participation and empower individuals. Unfortunately, he said, the same situation also provides the Establishment with the perfect opportunity for control and power.

Lovink stated proudly that he comes from a solid anticapitalist background. He studied political science and became active in the squatters and ecological movements, going on to create pirate radio stations and an alternative publishing house. He is a great believer in supplying alternative information to that provided by Authority, with a capital A.

The Internet supplies the perfect means to do this, and allows people to speak up individually in response. "The Internet has a potential to break the centralised media monopolies and their one-to-many model. It can implement the many-to-many

model through public access and the support of public content. But time is quickly running out for the 'new' medium. Big companies are taking over at this very moment and it is in their interest to turn the Internet into an old-fashioned, one-to-many medium, turning the users into passive consumers of their commodities, without root access. Democratisation in the age of cyberspace means giving people access to the technology itself, not just asking their opinion."

And that is why Lovink is glad to predict the end of the intellectual as public minder. "Intellectuals throughout the 20th century have imagined that they would have the role of leading the people to the future, and if technology or a dispersion of media is destroying that idea of centrality of certain discourse, I am very happy about that."

The Net doesn't need that kind of intellectual, he said. What it does need is public spaces where free discussion and criticism can take place. However, the Internet as an independent democratic structure is not a certainty. Lovink's fear is that it will be controlled by forces like those involved in television.

"A lot of control mechanisms that have been used, that destroyed the previous public spaces, are being put into place on the Internet." He noted the decline of newsgroup culture, the surveillance of email and increased discussions about Net censorship as examples of the way the public sphere is slowly being chipped away. "Its future depends on the people who will now step in and define that space. Define it, renew it and shape it. Others will not do it for us."

"Not enough people outside [the areas of] commerce and regulation are seeing that there is still an opportunity to act, to start and control your own infrastructure." He said that people wrongly believed large ISPs would supply that infrastructure; these businesses are only interested in setting up email accounts and access to the Web. "People have no idea that there are other features on the Internet that have another structure and philosophy. They rely too much on big companies and they accept the fact that a lot of things are now limited."

It all sounds like a lovely idea, but do people want to be empowered? If Amsterdam's Digital City, an



Internet community founded by Lovink with 50,000 users and 10,000 home pages, is any indication, then the answer is yes.

De Digitale Stad (DDS), launched in January 1994, represented for many their first contact with the Internet, and it rapidly grew into a symbol for a public cyberspace, said Lovink. It is now Europe's largest and most public computer network, with scores of phone lines, free email addresses for each user, home page disk space, contact and information dissemination points, and above all, said Lovink, the freedom to not be bothered by censorship and surveillance.

This freedom is a major reason for its success, but because the system is so big, hardly anybody, including its management, has an overview of it. Even the

freedom of DDS is limited in certain respects; content control does take place, but it becomes difficult, said Lovink.

"I don't say free access for all," he said. "There is a lot of racism going on at Digital City. It is a huge thing, and there are a lot of loonies out there. What we try to do is explain again and again that the users have to actively post this, but also report to operators what is going on and make us aware that those kinds of things exist so that they can be tackled and addressed publicly. I think that this is very important, instead of just running immediately to the authorities, which happens; we have had visits from the police in the Digital City office because of fascist things going on."

"We chose this model so we need to be responsible for it. We can't just lie back and say, 'Oh, free speech means you can do whatever you like.' And we also do paradoxical things against our own principles — just remove people or whatever — in the worst cases. If you come from a very pure radical background, like many of us do, then it is a challenge, but it is also a thing you have to get used to, that it is a dirty environment in a way. You have to develop new ethics to cope."

The content regulation that is being discussed worldwide at present is another matter, however. Lovink believes debate on the issue would be more sensible if politicians knew more about the subject. "Politicians are still used to communicating with their constituents via television, or visits or meetings, and they are overwhelmed already by media." He said there is still very little computer use in most political offices, and the Internet is often just seen as another burden.

"The question is, where do they start? I would say shut your mouth and start wiring yourself up first, instead of only coming up with all kinds of funny regulations, censorship and all that kind of stuff, without having any clue about the technology."

And the solution for content providers is not hiding out and ignoring the situation, he said. "I don't believe in free content islands where we will store our data and all that romantic cowboy stuff — that is seen as the only way, you know, to go to islands and put up your service there. I think we should just face the situation here, either in your country or mine, or wherever people are. I don't believe that there are safe havens for data in the long term, so the only thing we can do is actively oppose those things."

Lovink doesn't imagine a world of outspoken free individuals voicing their opinions and making changes to society via the Internet alone. Some people will probably never have access to the Net, he admits, and many others are living in cities without the infrastructure necessary to make the phone call.

"If we only operate in the very small field of what I call strategic media, like the Internet is now, then I think you are right, it will be impossible for all to have an opportunity to speak." Other media and technologies have an important political and educative role to play, he said, and used the example of rural India, where television is rapidly spreading. He insists that won't just mean a dose of 'Baywatch' for more people. "Not if people have the possibility to make their own videos and networks, as happened recently in Russia."

"We can always say to ourselves that 99% have no access to whatever media, but I have never heard any wise idea that comes after that basic fact. Yeah, it is a fact, but most of the time it is used to kill off a line of argument rather than being the start of something."

And Lovink has started something in Eastern Europe, which after the fall of communism still has a lot of state-controlled media. Often the only other option is commercial networks that show Western content via satellite. So Lovink has helped the locals create avenues for independent voices to be heard.

"If these voices are not there and if people are just facing state monopoly-controlled media — propaganda — then things may turn very violent quickly. So Press Now [<http://www.dds.nl/~pressnow/>] was set up [by Lovink and others] to support the independent media in the former Yugoslavia." He has also been teaching media theory, organising exhibitions and setting up computer networks in the region.

"People are still faced with those post-communist structures [which are still] very much in place, maybe taken over by local Mafia or by various government people. There are really attempts throughout the region to censor and restrict people having access. So the 'civil society', as they [in eastern Europe] call it, with its own independent media, has a vital role to play. This is really a guarantee to prevent the spread of big ethnic conflicts. They can't tackle a state monopoly on information really, that would be too much. But at an essential moment when conflict is spreading, they can be counterattacked. Through publications, through critique, through the expression of other voices, moderate voices."

Lovink was incensed by the suggestion that any of his ideas and beliefs were on the edge of thinking. "We are on the forefront of thinking, not so much on the edge," he chastised me. "We are not a subculture, not any more — we are developing software and developing interfaces, having systems like DDS which are huge. We are operating in the field of public access television and radio and so we're not at all marginal in that sense. Some things can be illegal or against the law. But we don't mind that so much." ■



"We are at the
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Spam belongs in a can

BY DAN TEBBUTT

Tacky junk mail and advertising is the way of the world. Why should the Internet be any different?

Distracting junk is an inherent part of modern life. Tacky mail offers, cheaply printed catalogues, leery billboards. Indeed, our whole television experience centres around regular ad intervals. The Internet is merely the latest technology delivering the same effluent. Most of it, like paper equivalents, is bound for the bin without a moment's hesitation.

Net junk, however, is unprecedented in several ways. Global reach, ridiculously cheap distribution, scant regulation and surprisingly high response rates make spray-and-pray Internet marketing appear attractive. The same reasons explain why digital debris is quickly debasing online life.

Spam, as this junk is known (the term has its origins in a famous Monty Python sketch), takes a number of forms. The most pervasive network abuse is unsolicited commercial email (UCE), semiliterate product hawking, pyramid-selling scams, pornography and the rest. Almost all Netheads will encounter UCE. Perpetrators range from small-fry con artists to gullible multinationals and even putatively responsible bodies like the Software Publishers Association, which last year spammed 300,000 FTP administrators about software piracy.

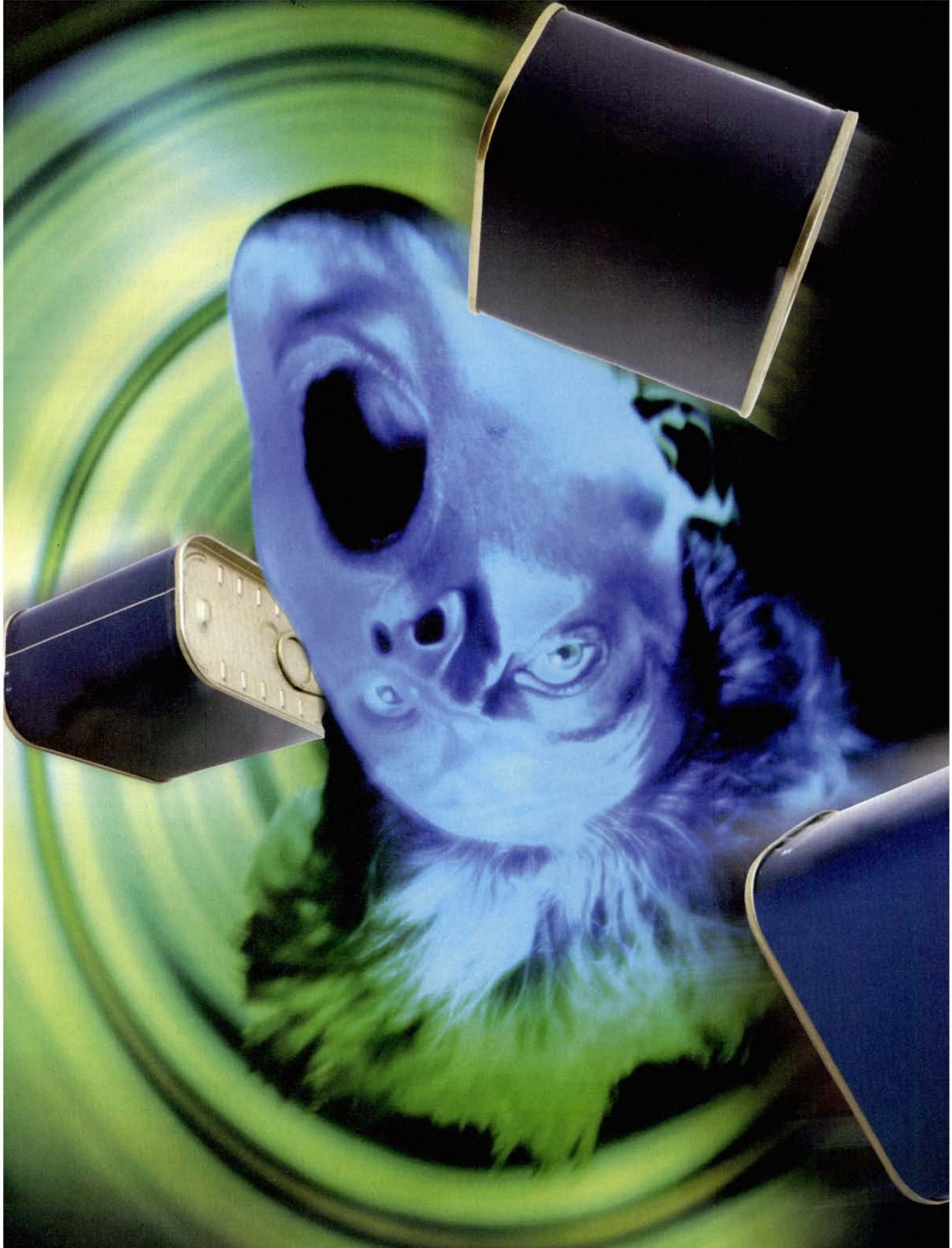
Sending UCE is ridiculously easy — any drongo with email can copy-and-paste addresses to peddle their wares. Sophisticated spammers build multimillion-entry lists using automatic 'spambot' software to crawl through Web pages and newsgroups harvesting email addresses.

UCE is on the rise. Reliable figures are scarce, but one recent estimate suggested 13 billion unwanted emails circulated in 1997. An insidious new format is 'metaspam', spam advertising lists and services for spam. Irony-oblivious metaspammers even take to spam to advertise spam-blocking software.

Usenet newsgroups are another favourite spam haunt. It used to be that ads were simply excessive crosspostings (ECP) harassing multiple discussions. Then, as Usenet ECP rules tightened, spammers started excessive multiposting (EMP), sending the same message to many newsgroups separately. (Current Usenet thresholds are defined at <http://www.math.uiuc.edu/~tskirvin/home/spam.html>.) EMP is actually worse, since the same unwelcome data is carried many times, further burdening ISP resources. Filtering by archive company DejaNews suggests as much as 65% of news traffic may be garbage (see 'Is spam choking Usenet?', page 76).

Another spam controversy relates to so-called 'spider spam'. This involves embedding misleading text (frequently pornographic terms or competitors' products) in Web pages to deceive search engine spider software and lure unsuspecting surfers.





Is spam choking Usenet?

Usenet faithful are spam's most aggrieved victims. The chattering classes dread downloading their rants *du jour* only to find reams of garbage hocking get-rich-quick scams and pornography. They're also a favourite target for spam robots that trawl newsgroups to extract email addresses for junk lists. Willy diatribists now use obviously misleading return addresses (such as dant@acp.antispam.com.au). Signature instructions help legitimate people respond, while spambots harvest worthless data.

New evidence suggests the problem may outstrip even pessimistic expectations. Last December, the mother lode of Net news archives DejaNews started applying software filters to the 5G-per-day blather bath and the results were stupefying: around 65% of Usenet traffic was rejected as spam! The company siphons off a third of 730,000 daily postings as likely junk mail, while a further third consists of spam cancellation messages. The remaining portion, around 260,000 messages, is good gossip.

The preponderance of spam devalues Usenet content for participants and adversely affects the advertising-supported DejaNews archive service, according to company vice-president David Wilson. "The whole value of the site is predicated on quality of information," he told APC.

DejaNews creates a linguistic finger-

print for each message: if too many similar patterns are found, all the matched postings are rejected. Other antispam measures include enforcing crossposting limits and blocking known spammers along with peculiar spam phrases unlikely to occur in genuine messages. "The game always changes, and we have to just stay ahead," said Wilson. "It's a cat-and-mouse thing."

DejaNews filters don't affect the live newsgroup, but two groups are attacking the problem at its source. The first is ISPs, who have obvious interests in improving customer satisfaction and reducing traffic and storage costs. US access provider EarthLink introduced an algorithm that looks for abusive posting patterns and then slows down the posting rate for those messages, meaning a single spammer would need weeks to

flood multiple newsgroups with separate but similar messages (see <http://www.earthlink.net/assistance/status/newsannounce.html>).

Secondly, a group of community-minded activists trawls through discussion groups to nuke spam messages with 'cancelbots'. Despite the nefarious-sounding name, cancelbots are actually manually operated programs that retract spam from the Usenet stream by issuing RFC 1036 cancel messages (see <http://www.uiuc.edu/ph/www/tskirvin/cancel.faq>). Cancellations are notified publicly in the antispam news.admin.net-abuse.* newsgroups.



Why is spam a problem?

Junk mail is annoying but hardly threatening — so why should digital junk be any different? Indeed, spammers argue they're simply fulfilling a market need and if spam was not effective they'd fast be out of business.

Realistically, spam thrives by abusing the Internet's unique social, technological and economic structures. Whereas each paper junk mail can cost 50 cents to deliver, digital detritus costs a few cents or less. For example, spammer Silva's Direct offers to send 10,000 messages for \$US35, or 100,000 for \$US90, or 1 million for \$US550. A more

outrageous offer circulating recently peddled a reusable CD list of 57 million addresses plus pirate mailer software for \$US99. "It only takes the very bottom 0.001% of humanity to just once get the idea that it is acceptable and we all have a serious, continuing problem," commented Melbourne Net activist Robin Whittle.

More galling is the fact that Internet users actually pay to receive this sputum, both in connect time and increased ISP operating costs. Spammers enjoy artificially low cost structures because they externalise the burdens of delivery and disposal onto the whole wired world. Elementary economics would recognise spam

as classic 'freeloading' akin to trucking companies evading road taxes or chemical companies who dump untreated waste into waterways.

ISPs feel the cost impact of spam as it clogs server disks, wastes bandwidth and inflames customers. America Online, the world's largest ISP, is leading the legal charge against junkmailers. It successfully obtained court injunctions to stop several flagrant spammers sending mail to AOL subscribers unless specifically requested. "[Spammers] are the snake oil salesmen of the electronic age," said George Vradenburg, AOL's legal counsel. CompuServe and freemail services BigFoot and Juno also litigated to stop spammers forging addresses from their systems; much spam arrives with fictitious return addresses such as abc123@juno.com, resulting in thousands of complaints and mailbombs to innocent postmasters.

Private litigants are now taking up the cause. One high-profile victory was won by Cisco education manager Tracy LaQuey Parker who successfully sued the spammer that forged her flowers.com business name in a mailout. The court ordered the spammer to pay damages and cease forging addresses.

High-tech warfare

Spam results from misuse of good technology. Hence it would be reasonable to hope technology may hold answers. Unfortunately, while software can help with filtering rules that trash conspicuous spam before it hits the in-box, technology is only part of the solution. Phil Agre, a US academic and editor of *The Network Observer*, points out that filtering only helps technically literate users and does nothing to help newbies or to relieve ISP burdens. "Spam is a community problem — your basic invasion of barbarians — and it requires a community solution," said Agre.

Part of the problem relates to the ease of spamming and difficulties in tracing culprits. Windows NT made setting up email servers easier than ever, but it also mushroomed the number of neophyte postmasters. Coupling inexperienced administrators with relatively immature software is a recipe for security loopholes, and times were never better for spammers to hijack corporate and ISP mail servers. Consequences for the hijack victim include floods of bounced messages and image-denting outrage or retaliation.





Tracking spam sources is not particularly easy. Return addresses are rarely

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ISPs feel the cost impact of spam as it clogs server disks, wastes bandwidth and inflames customers.

valid, and even SMTP headers can be forged with no great effort. Every message must enter the information stream at some point, although tracing email may require cooperation from postmasters at multiple sites. Spam FAQ (see 'Spam canning resources', page 84) details tracing techniques, but urges caution before making accusations, because headers may contain a mixture of accurate and forged data.

SMTP is a permissive protocol, but email vendors could help by improving header reliability. J F Sullivan, group manager of Netscape's messaging division, said Netscape Mail Server can authenticate senders via SMTP, by tagging suspicious messages. The next release will carry authentication data via non-Netscape intermediaries for wider verification. Similarly, Novell's Group-Wise 5.2 can perform a 'reverse lookup' on incoming mail to ensure headers contain correct DNS information. Novell collaboration division vice-president Paul Smart said all messages must still be accepted because routing configurations can make around 30% of headers appear spoofed. The company is currently developing pattern-matching features to help catch spam before it clogs corporate arteries.

"There's room to ensure greater authenticity of headers as part of this whole area of secure mail and encryption," said Eric Faunce, marketing director of Lotus messaging, "but it's not easy for the industry to come together." Lotus is implementing a more open security framework in this year's Notes 5.0 releases. LDAP could be a point of convergence, but Faunce warned it's "not a panacea".

New Zealand email developer David Harris took a different approach in Pegasus Mail, a popular free multiplatform package. Supplementing a licence condition prohibiting spam usage, Harris added extra headers to identify potential spam. Messages with over 50 recipients are marked with 'X-Distribution' headers reflecting the volume of addresses. Recipients and postmasters could then set up rules to manage identified bulk mailings according to Pegasus flags.

Unfortunately, Harris' efforts were misconstrued and Pegasus Mail was listed as

spam software in a US government bulletin. The alert was subsequently corrected, but not before Harris had to remove X-Mailer headers to protect Pegasus users (the X-Distribution headers remain). Harris insists spammers use Eudora and Netscape as often as Pegasus, and his package was maligned "through ignorance". "What really burns me up most about this whole issue is the way that I keep getting victimised through trying to be a responsible developer," protested Harris.

Nuke that spam

Major email vendors were slow to extend antispam features beyond filtering rules, an imperfect approach that demands technical skill and frequent attention. Enterprising small developers responded to this opportunity with numerous spam-slamming utilities (see 'Put spam back in the can', page 82). Faunce indicated that Lotus is partnering with specialist developers to integrate antispam features and automate updates.

Unix boasts the best spam-killing tools. That's cold comfort to most desktop users until it's observed that most ISPs handle email through Unix. Hence, game readers can set up Unix tools like SpamBouncer (included on **apcmag.cd**) to filter mail before downloading. Unix newsreaders

How Hotmail fights back

For the world's largest email provider, spam is a serious problem that costs big dollars in terms of traffic and storage, customer satisfaction and defusing retaliation. Far from resting on its laurels,

message headers which can help ISPs and law enforcement track down spammers and disable their Net access.

Most apparent Hotmail pollution results from forged SMTP headers, Douty claimed.

In January the Silicon Valley company distributed a free software add-on enabling ISPs to filter illegitimate Hot-Mail messages, and later it will help email vendors integrate similar functionality. Hotmail's SMTP relay host is now closed to prevent spam bouncing through HotMail, and Douty said legal action is pending against identified forgers.

Protective measures for Hotmail users include site-wide filtering, managed by a five-person team, to block



Hotmail — which provides free Web-based email to over 10 million users, with 1.5 million new accounts added each month — is taking technical and political action to rein in junk mail.

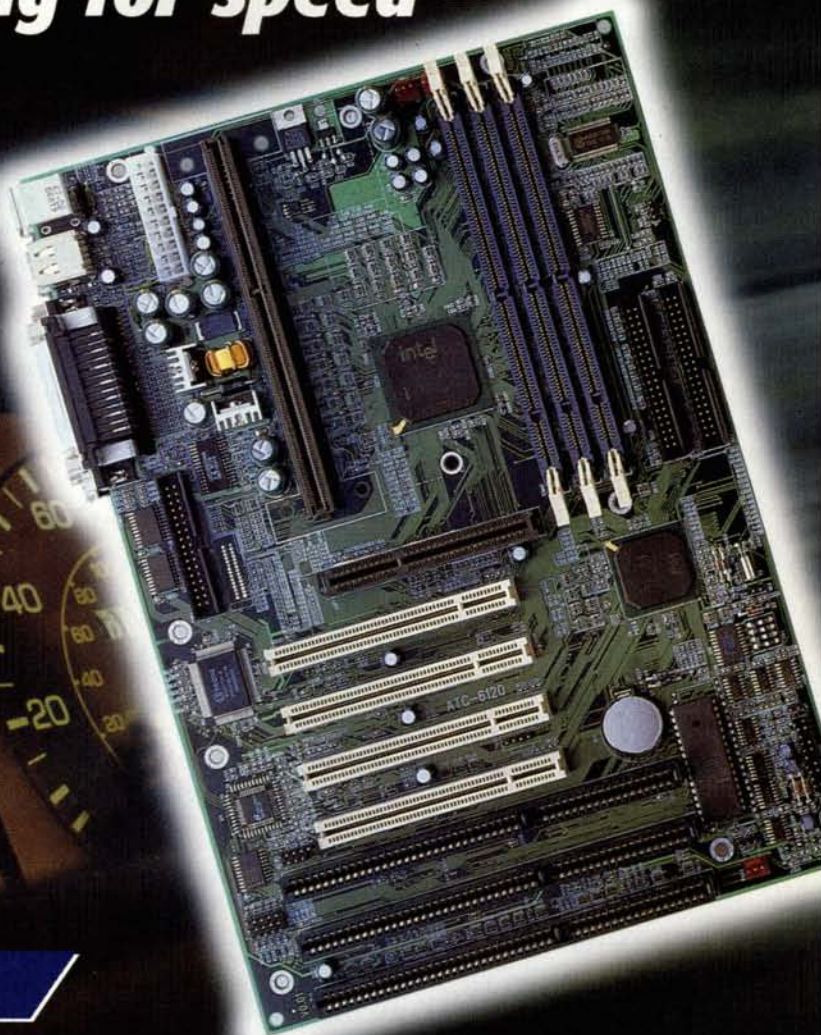
A 'zero tolerance' policy means accounts are terminated for even a single verified abuse. Although Net mailers have come to dread Hotmail as an apparent spammers' lair, sales and marketing vice-president Steve Douty insists only around 1% of purported spam actually originates at Hotmail. He points to strong measures to control junk effusions, including limiting outbound messages to 25 recipients and banning numeric user names. Hotmail encapsulates the originator's IP address in

known spam domains. A new interface feature allows individual users to block spammers with a simple button-click or by listing unwanted email addresses.

Douty said Hotmail is an active contributor to mailing lists and newsgroups in the antispam community. The company participates in CAUCE and last year testified before US government inquiries. It supports antispam legislation, particularly to prevent header forgery, which Douty sees creating a major image problem.

"Technology is only part of the battle," he said. "Fighting spam requires a combination of technology, industry cooperation and legislative measures."

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(including Netscape Communicator for Unix) can eradicate known spammers and ECP through a killfile. If you maintain a killfile, SeattleLabs Blacklist Import Wizard (see apcmag.cd) helps combine data from the many blacklists online.

Technical napalm notwithstanding, fighting spam with technology alone is a losing battle. Whittle believes filtering will eventually automate most spam disposal, but Harris is less optimistic. "There is no technical solution to spam, any more than there was ever any kind of technological solution

Web pages is a start. You can further confuse spambots by masking your address in your signature file, Web pages and news postings (see 'Is spam choking Usenet?' 76). Agre warns against using opt-out lists since they serve only to verify your email address and — even if they do work — they only legitimise spam.

To go further — and possibly make some money — the Blacklist of Internet Advertisers suggests sending a note (preferably by registered mail) to spammers warning that you will charge \$500 to

prove necessary. "Spam is a social problem and cannot be overcome by technical means. It can only be dealt with through the normal channel of social regulation, the law," Harris argued. "The cold hard reality is that spam is currently legal, and while it's legal, no amount of social odium is going to stop people from doing it."

The Net community is doing its best to generate disapprobation. Usenet volunteers are fighting back against newsgroup spam. Numerous Web pages carefully record spammers' activities. Blacklist of Internet Advertisers, for example, tracks repeat offenders in junk email and newsgroup spamming, outlining their transgressions and contact details. Entries are maintained for three months then dropped, unless Netiquette violations continue. Axel Boldt, the Blacklist maintainer, is regularly threatened with lawsuits for defamation, interference in trade, hate-mail, even "Internet terrorism". "Usenet itself is a wild frontier — your [sic] acting like a lynch mob," claimed one flame in a bizarre *non sequitur*.

Boldt advocates that "punishing of unwelcome behaviour should be done by private individuals, following the same grass roots philosophy that governs the rest of the Net". Electronic Frontiers Australia (EFA) board member Danny Yee echoed Boldt's view: "I see spam as the test case for whether autonomous Internet governance can work or not."

Some aren't convinced vigilantes are the answer. "This yearning for the Internet to be unregulated is utopian," argued Paul Bambury on Link, an influential Aus-

"There is no technical solution to spam, any more than there was ever any kind of technological solution to fax advertising or junk mail."

to fax advertising or junk mail," Harris said. "Whatever science can design, science can also duplicate. Even if most responsible developers tried to take action against spammers, there would always be some irresponsible developers who would not."

By opposing, end them

To take up arms against a sea of spam might not be as futile as first imagined. A number of practical steps can generate significant vexation for spammers.

In 'Put a Spammer in the Slammer' (see 'Spam canning resources', page 84), Agre documents potential avenues of complaint that are closely mirrored in Australia. If you can trace the message, the spammer's ISP should be the first avenue of complaint. "Most reputable ISPs hate spam, so be polite," admonishes Agre. He suggests asking your own ISP to provide antispam measures. As AOL's lawsuits and Hotmail's filters (see 'How Hotmail fights back', page 78) indicate, reducing the spam intrusion could become a key point of differentiation between ISPs.

Law enforcement bodies and trade practices watchdogs like the Australian Competition and Consumer Commission (ACCC) and state consumer affairs bureaux are always interested in attempted fraud such as pyramid schemes or get-rich-quick deals. If a spammer claims they made thousands of dollars, you might want to alert the Australian Taxation Office. Agre explains how to attract attention from scandal-hungry media — make 'A Current Affair' work for you.

Keeping your address off spam lists is hard work. Avoiding mailto URLs in your

proofread any UCE they send. If they hit you again, issue an invoice. When they don't pay, sue in a small claims tribunal; if you win by default, sic a collection agency onto them, which could ruin their credit standing. The same approach could be directed at a spammer's verified ISP, although neither tactic is legally certain.

For ISPs, the Blacklist advises including a spam damages clause in service agreements so spammers can be sued. If spam is passing through your servers, deny access from the spammers' domains, particularly for the SMTP port which can cause the junkmailer's sendmail spool to overflow.

For businesses, the best advice is to ignore tantalising claims and refuse to advertise through spam. Notwithstanding wild argu-

"Spam is a market failure. Autonomous governance doesn't seem to be working."

ments that traditional media interests want to restrict cut-price competition from spammers, for most companies using spam begs for a public relations and IT disaster.

"If we despair about spam then the spammers win," argues Agre. "Many thousands of people are working against spam, each in their own way. If you simply pick the one method that you find most convenient then you can be confident that these antisocial people will eventually be compelled to find better ways of making a living."

Legal fightback

Technology and practical steps can combat spam, but legal curbs may ultimately

tralian discussion list. "Despite its unique technological nature, the Internet is a social structure, maybe even a society. It seems unreasonable to expect that abusive behaviour will be tolerated by a society."

"Spam is a market failure. Autonomous governance doesn't seem to be working. If governments are interested in regulating the Internet, they should be encouraged to do so in the area of privacy which would include spam and other intrusive behaviours. This might be an opportunity to help them understand."

The Federal Government's infamous backdown over privacy protection dampened prospects for helpful intervention in Australia. In the US, legislators are at least

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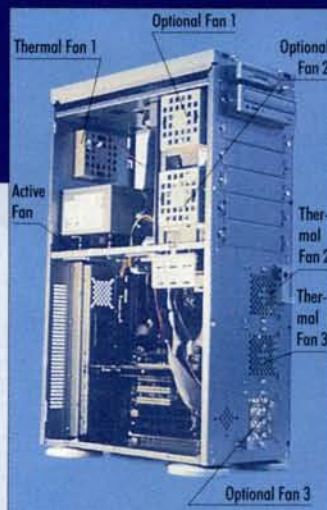
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awake to spam, even if early proposals appear misguided. Last July Nevada became the first state to pass spam regulation, threatening fines for junk emailers and ISPs. The law is due to take effect this July, but civil liberties advocates are already foreshadowing challenges on free-speech grounds.

The US Congress entered the fray soon after Nevada made its stand. At least four bills were directed at spam. One seeks to restrict UCE unless requested or part of a prior relationship (Smith Bill), another mandates that advertisements be labelled and opt-out requests honoured (Murkowski Bill), a third prevents commercial advertisers from using false addresses (Torricelli Bill) while the weakest calls for an industry working group to set voluntary guidelines (Tausin Bill). Whether any proposals would become law was undetermined at press time. The Coalition Against UCE (CAUCE), the preeminent US antispam lobby group, supports only the Smith Bill, which involves extending existing restrictions on junk faxes. CAUCE alleges that spam and direct marketing interests support the weaker proposals, which could legitimise spam. "Legislation is interesting — but it has to be effective," cautioned Netscape's Sullivan.

Consistent with the Prime Minister's US-inspired technology enlightenment, Australian Netizens may need to wait for foreign leadership before our government takes action. As the spam deluge intensifies, calls for action can be expected to intensify. "Since the senders are using our communications equipment . . . it is incumbent on them to respect the desires of those who they communicate with," said Whittle.

"To the extent that this fails to happen, and to which no personal defences can be developed, it could be argued that it is the responsibility of government to devise a regulatory scheme which is effective." Still, Whittle is cautious. He believes the Net community should attempt to control spam through technical and social response before supporting government intervention.

"The law is how society distinguishes between acceptable and unacceptable behaviour," said Harris. "Until society [particularly US society, since that's where more than 95% of all spam originates] wakes up to this and takes the necessary steps, spam is going to continue to consume an ever-increasing proportion of the limited bandwidth of the Internet." In any event, 1998 will be a defining year for user control on the Net. ■

Put spam back in the can

Cunning software utilities can help you stem the tide of junk email. By Kieran McNamee

Fed up with sorting through loads of messages advertising dubious goods or proclaiming get-rich-quick scams? Then rejoice in the knowledge that there is something you can do about this growing problem. APC Labs tested 10 Windows anti-spam tools that aim to block junk from the end-user level (see also 'Step by Step', page 135). Choose your weapon and unite with millions of other helpless-no-longer Net users in the battle to put spam back in the can. (All software packages reviewed are on this month's **apcmag.cd**.)

SpamKiller 1.6

<http://novasoft.base.org>

A small envelope in the system tray is the only evidence that SpamKiller is at work. Set the timer to check your mail and whenever new mail arrives SpamKiller will not only open your mail program, but also scan the messages for evidence of spam. Junk emails can be deleted even before they reach your inbox or, to be on the safe side, SpamKiller can mark spam for later deletion. SpamKiller's filtering rules are comprehensive, examining anything from the sender or subject of the message to other headers that often accompany spam, such as 'X-Advertisement'.

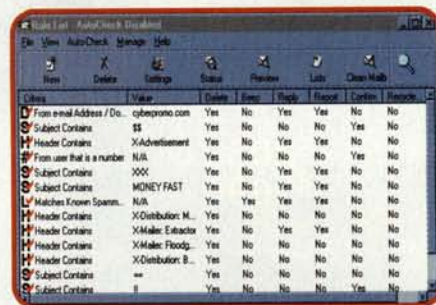
A list of 3,000 known spammer domains is included, and if you register, automatic list updates are made available. SpamKiller can reply automatically to the sender of the junk email or com-

plain to the postmaster of the domain where the message originated. A log tracking killed messages is a neat reminder of the quantity of spam you would have received if you weren't using SpamKiller.

Spam Exterminator 3

<http://www.unisyn.com/spamex>

Spam Exterminator is similar to SpamKiller and it boasts a huge list of 3,200 known spammer addresses and domains — with downloadable updates. As with SpamKiller, Spam Exterminator can respond to the sender and postmaster of the spammer's domain. Instead of listing

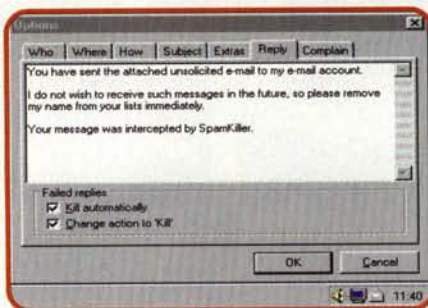


what junk email was deleted, Spam Exterminator provides a table showing the number of times a particular rule has been implemented. This table also displays settings for each rule, such as whether to confirm before deleting a message. There is also no fear of deleting friends' correspondence, as you can specify certain addresses from which all email should be accepted. After scanning your mail, Spam Exterminator will notify you and give you the option of reading your mail without having to open your mail program.

SpamScan97

<http://webster-image.com/SpamScan97>

SpamScan97 uses a limited number of filtering rules (with updates posted on the



Filtering your email

All major email programs claim they are able to filter messages according to rules defined by the user. Whether your mail package of choice is Eudora Mail, Lotus cc:Mail, Netscape Messenger, or any of the other commercially available options, setting filters is basically the same, and thankfully very easy.

Building a filtering rule starts with selecting the message part that the filter should examine. Normally you would type in the text that you do or don't want to be caught by the filter. You may also specify what you want to be done to any of the messages caught.

You can, for instance, transfer all messages from Uncle Bob to a folder called 'Family' so that you can read them when you have more time. To do this you would create a filter that scans the 'From:' header for Uncle Bob's email address; if his address is found, then the action that the filter takes is to transfer the message to your Family folder. Filters can do this automatically for any number of rules, which allows you to organise your mail and save time.

Using the filters in your email program is a handy way to block spam, but it's not very scalable because all rules must be created individually. In order to identify spam, you can use filters that

look at the sender of the message, the subject of the message, the body of the message, or other headers typically found in bulk mailings. If you only receive spam messages from one particular sender, then you can easily filter all messages sent by that person. However, it's more likely that you'll receive a growing number of spams from numerous senders, so it will take forever to create enough filters to block all junk email. (For more information on creating email filters to block spam, see page 135.)

On the server side, some mail servers also offer filtering capabilities that allow spam messages to be deleted before being downloaded by the client. Seattle Lab's SLMail (<http://www.seattlelab.com>) includes spam filtering as one of its main features, with similar functionality in commercial packages such as Netscape's Mail Server.

Similarly, a smart little utility from E-Scrub Technologies called Deadbolt (<http://www.e-scrub.com>) can be installed on your ISP server. For a yearly licence payment of \$US14.95, users can automatically have their email scanned against a constantly updated blacklist of known spammers. Any messages originating from an address on the blacklist will be deleted and the user won't even know they ever arrived.

Web) combined with two lists ('banned' and 'friendly' email addresses) to determine which messages are spam. SpamScan automatically deletes apparent spam, and lacks the ability to mark spam messages for later deletion. If you are afraid of losing important messages, then a simulation setting can be used until you become more comfortable with the capabilities of the software.

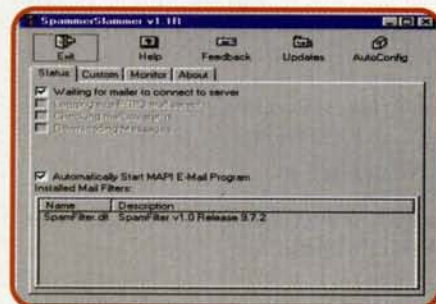
An important feature of SpamScan97 is the enforcement settings for each rule. If a rule is broken and its enforcement is 'suffi-

cient', the message will be deleted; if enforcement is 'combined', then at least one other rule has to be broken for the message to be deleted. Related rules can be grouped together so that if one of the rules is broken it won't necessarily mean that the message is identified as spam. For example, a rule filtering out messages containing the word 'guarantee' in the body could reject innocent messages from colleagues — but if the words 'money', 'minimal outlay' and 'no risk' also appear, the message is more likely to be spam. By grouping all these words together and selecting 'all in group' enforcement, the message must contain all these words before it will be identified as spam. Overall, if you have time to tinker around with the rules and enforcement settings, SpamScan97 is a reliable and effective program.

SpammerSlammer 1.1R

<http://www.spammerslammer.com>
SpammerSlammer uses an intelligent

decision-making approach to mark spams using one of five different levels. The setup is a little weird, so check the SpammerSlammer Web page for instructions on how to install the program for your email application. SpammerSlammer has no spammer domain



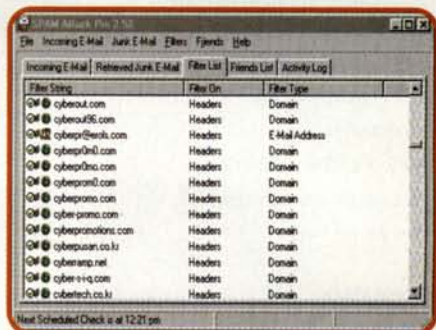
lists to maintain, and all rules are automatically updated each time the program is started.

Before each message is downloaded to your inbox, SpammerSlammer scans the message and, if it decides it is spam, will give it a tag. If a message is given the SPAM5 tag, you can be virtually certain that it is spam. As the rating falls so does the certainty that the message is rubbish. You may decide to only delete messages that SpammerSlammer rates 4 or 5 to reduce the chance that normal messages are trashed.

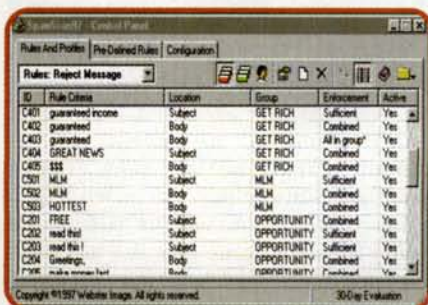
Spam Attack Pro 2.5

http://www.softwiz.com/html/spam_attack_pro.html

With a list comprising around 1,500 known spammers, Spam Attack Pro sits in your system tray, quietly scanning messages for spam. If you want to scan



subject headers and the body of a message, you have to set that up yourself. To help Spam Attack Pro from mistakenly detecting messages that are not spam, you can enter the email addresses from which you receive legiti-



mate mail. Spam messages can be automatically deleted or retrieved for later deletion without having to go through your normal email program. Spam Attack Pro will notify you when new messages arrive and creates a log detailing each time it scans your messages. There is also an option to send complaints about spam messages, though this is not automatic. In the registered version, automatic filter updates are available.

Spamicide

<http://www.compulink.co.uk/~net-services/spam>

Spamicide is very easy to use and does not require much user intervention. Initial settings are recorded with a set-up wizard, which also allows you to enter addresses from which to always receive or reject messages. The other spam detection rules are hidden from the user. All spam found is moved to the trash folder for later deletion, and once all mail has been scanned your email program is opened and messages downloaded. The trial version detects all spam, but deletes only half the junk mail — for full functionality, the \$US45 registration is necessary.



MailJail 2.0

<http://www.mailjail.com>

This is a specific plug-in for Eudora 3.03, with Microsoft Outlook and Netscape Messenger versions expected soon. An otherwise solid product, MailJail's only drawback is that, unlike other antispam programs, it does not save costly download time by scanning messages in advance. There are 250 predefined rules for scanning message headers and body, providing basic protection from most common types of spam. If MailJail determines that a message is spam, it tags the bottom of the message in a way that allows Eudora filters to trash the message. One of MailJail's strengths is its ability to create user-generated rules easily. Simply clicking a button teaches MailJail what messages you define as spam so that similar messages will not be accepted.

Interceptor

<http://www.grok.co.uk/interceptor>

Interceptor sits between your mail program and the server, scanning each message before download. It removes any messages that filters identify as spam. The only problem is that you have to set up all the filters yourself. You can download some filter lists from the Interceptor Web page, but they are nowhere near as comprehensive as some other antispam program lists. A log file contains the details of any deleted messages, together with the time, date and reason for deletion. The main reason for using Interceptor rather than using your email program's filters is that messages do not have to be downloaded before they can be scanned.

MailTalkX

<http://www.softbytels.com/MailTalkX>

This program performs a variety of email tasks, including filtering and deleting spam before you download your messages. Unfortunately, no rules are provided and it will only filter on the headers of the message, not the body. MailTalkX may be useful in notifying you when you receive new messages, but it lacks the capabilities to make the process of blocking spam simple and effective.

Spam Hater 2.07

http://www.cix.co.uk/~net-services/spam/spam_hater.htm

This program will probably make more work for you than it will save. Spam Hater does not block spam messages but scans through already downloaded messages, picking out potential spams as it goes. You are then given the option of sending a

Spam canning resources

Resource	URL
Agre, Phil: Put a Spammer in the Slammer	http://weber.ucsd.edu/~pagre/spam.html
Australian Competition and Consumer Commission (ACCC)	http://www.accc.gov.au
Blacklist of Internet Advertisers	http://math-www.uni-paderborn.de/~axel/BL/
Clarke, Roger: Spam	http://www.anu.edu.au/people/Roger.Clarke/II/Spam.html
Coalition Against Unsolicited Commercial Email (CAUCE)	http://www.cauce.org
Fight Spam on the Internet	http://spam.abuse.net
Get That Spammer	http://kryten.eng.monash.edu.au/gspam.html
Junkbusters	http://www.junkbusters.com
Robots and Mail Filtering	http://www.ii.com/internet/robots/
Net-Abuse newsgroups	news.admin.net-abuse.*
Net Abuse FAQ	ftp://ftp.cybernothing.org/pub/abuse/net-abuse-faq.txt
Spam Hippo	http://www.spamhippo.com
Spam Tools Mailing List	http://www.abuse.net/spamtools.html
Spam FAQ (spam tracing)	http://www.bluemarble.net/~scotty/forgery.html
Spam-L FAQ	http://abuse.net/spam-l/
Current Usenet Spam Thresholds and Guidelines	http://www.math.uiuc.edu/~tskirvin/home/spam.html



prewritten reply to the sender of each spam message telling them what you think of them. Spam Hater is free and comes from the same people who developed the more useful Spamicide, which you have to pay for. ■

A microscopic view of numerous viruses, appearing as orange and yellow spherical particles with spiky surfaces, set against a dark blue background. A bright circular glow is centered behind the text "Protect your network".

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Truly, madly, deeply

While using a computer won't mark you out as a freak these days, there are still enough Mac zealots, Microsoft junkies and defenders of the Linux faith out there to make you wonder how a simple PC can incite such passion, fervour and obsessive behaviour. **By Ed Wehde**

Let's be honest. Some computer users are obsessive. They may keep using one outdated machine, or perhaps they simply can't log off the Internet. Like people in every segment of society, some computer users have their quirks. Diane George swears by his MS-DOS operating system. He has been using it for about 15 years and has never moved to Windows. George is a board member of PC Clubhouse, a PC users group. He uses his computer a total of about 50 hours each week, 30 hours at work and 20 hours at home for pleasure.

He likes DOS because of the ease of operation and the fact that it supports all the applications he needs to run on it. He said he started using DOS because, at the time, it was basically the only system available. Now, he keeps on using it because it is "the best operating system around"; he says he would not even consider using any other system.

Len Wines, a retired university administrator, is completely dedicated to his Mac. Wines has used other systems, including DOS, but he considers Mac OS to be "absolutely superior to all other operating systems". Wines said, "Windows is a copy of the Mac OS. Even Windows users will admit that the Mac operating system is better."

Wines, who uses his computer about 40 hours per week, cited the intelligence of the Mac and its ease of use as the reasons behind its superiority. "It is so user-friendly and intelligent," he said. "It is a great productivity tool. I would not use another system unless I was forced to, and I would definitely never use Unix."

And why does Brian Smithers, a college student, use IBM's OS/2? Because he has a "philosophical beef" with Microsoft. "Microsoft is pushing Windows on everyone, whether they like it or not," he said. "I'm trying to stay away from them, like a boycott." Philosophy aside, Smithers is satisfied with his OS/2 system. He has had it for four years, and uses it five to six hours a day.

Studies have shown that Apple consistently ranks ahead of other computers in terms of brand loyalty. For the past three years Apple has led the field in repurchase loyalty in an annual review of PC ownership conducted by Computer Intelligence (CI). CI measured the percentage of buyers of new machines that remained loyal to a particular brand, and found that 81% of Apple's customers bought another Mac. IBM and Microsoft did not find a place in the top five. "Probably 20% to 30% of computer buyers would be difficult to change," said Peter Kastner of the Aberdeen Group.

Analysts agree that consumer loyalty has had an effect on the marketplace. Saffo said that the dedication of its users has allowed Apple to remain in business. James Staten, an analyst with Dataquest, is even more emphatic about the value of customer loyalty to Apple. "Without a doubt, Apple users are the most loyal, almost feverishly so," he said. "The company would not still be around if not for the loyalty of its users."

Brand loyalty is one thing, but the obsessive use of PCs can have destructive effects for some people. Many users have trouble controlling the amount of time they spend on their machines, to the detriment of other aspects of their lives. Here are a few stories from the US.

A high-school student from Portland, Oregon, spends hours in chat rooms confiding details of his life he wouldn't tell even his closest friends. He has withdrawn from family and friends and his marks suffer. If he goes more than a day without logging on he starts feeling restless.

A Maryland woman ruined her marriage and neglected her kids because she was spending up to 21 hours a day online. The kids weren't being taken to the doctor, and the family ran out of heating oil and food.

A couple from Milwaukee, Wisconsin, both wound up in gaol after the husband's obsession with the Internet led to domestic violence. It seems the wife got sick of her husband spending inordinate amounts of



Sledging Intel online

Love to hate you

There are people who love a product to the point of obsession, and then there are those with a real chip on their shoulder about something. Big corporations that loom large over their competitors will invariably inspire paranoia, fear, rumour, innuendo and unauthorised Web sites exposing their darkest secrets. Intel is no exception.

Perhaps the best known site which regularly exposes details that Andy Groves' corporate minders would rather weren't revealed is Robert Collins' Intel Secrets (<http://www.x86.org/>). This site proudly promotes itself as revealing "what Intel doesn't want you to know" and having "no affiliation with Intel", and even includes a counter to track how many times Intel employees have accessed the site since 1995.

However, its focus is on revealing undocumented features of Intel's various products, and other technical arcana. Beneath the veneer of apparent scorn lurks the heart of a true techie who finds an undocumented opcode of more interest than a shonky business practice.

For slightly higher venom levels, you'll need to step across to The Anti-Intel Association (<http://users.aol.com/machcu/aia.html>). "Being the very anti-Microsoft person that I am, I was dismayed by the similarities that were emerging between Microsoft and Intel, and I started the Anti-Intel Association to try to inform people of other choices before Intel gets to the point Microsoft is at now," the site's author, David Schneider-Joseph, told *APC*.

The site itself professes "huge appreciation and admiration" for Intel's achievements in advancing PC technology, but objects strongly to what it describes as Intel's lack of innovation in recent times, and its obsession with profit at all costs.

"Intel is gradually becoming less of a technological innovator and more of a corporation bent on gaining market share," he writes. "Their advertising is creating a distorted version of the truth in the public's eye, they are using their near-monopoly to create an unlevel playing field . . . and their own microprocessors have been lacklustre recently."

Emphasising the last point, the main aim of the Anti-Intel Association is to promote alternatives from companies

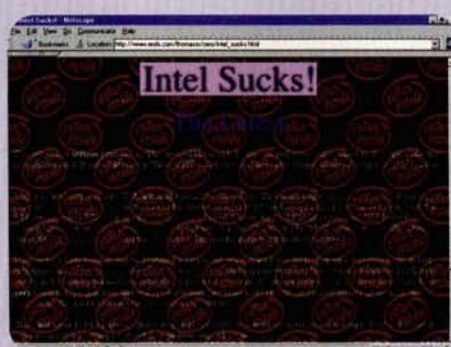
such as AMD, Cyrix and Digital, which it does mainly through a series of links. Despite these fairly modest aims (the site occupies just a single page), Schneider-Joseph claims some degree of success with it. "The people who visit it often comment on how they are pleased to see there are others who realise that Intel isn't the only way to go," he said.

If that seems too restrained, then you might want to check out Intel Sucks! (http://www.erols.com/thomassr/zero/intel_sucks.html), part of a family of sites looking at the downsides of particular technologies (others featured are AOL and Microsoft). Tom Vries, the author of this site, doesn't pull any punches. "Why does Intel suck, you ask? Well, first of all it should be called Untel. They make buggy, inferior processors," he writes, before providing an extensive series of links.

A long-time fan of Apple systems, Vries told *APC* that the motivation behind the site was simply to promote an alternative point of view. "I thought people should know the real story behind Intel and [its] products, which I believe aren't as reliable — or fast — as other companies," he said.

And what does Intel itself think of all this? "The Internet's such a good discussion forum," said Kate Burleigh of Intel Australia. "Even if these sites make assertions that we're not happy with, we wouldn't step in and try to correct it unless it was totally out of line or inaccurate." In fact, Burleigh said, the ability to become aware of customer opinions about Intel in this way was valuable to the company, since for the most part Intel as a PC "ingredient maker" does not enjoy direct contact with end users.

Angus Kidman



time online. The resulting shouting match escalated into shoving and punching, and both were arrested on charges of battery.

As more people get access to the Net, there are more cases of obsession with the medium. Dr Kimberly Young, a psychologist at the University of Pittsburgh, said that people become 'addicted' to the Internet in the same way a gambler becomes addicted to blackjack or an alcoholic needs a drink. She estimates that 5% to 10% of Internet users become addicted, a similar proportion to the number of drinkers who become alcoholics. Young, who runs the Center for On-line Addictions, said that there is no typical addict. The stereotype of a Web junkie is an introverted computer geek who lacks social skills. Young said that is not the case. People who are easy conversationalists can just as easily get hooked by the social aspects of chat rooms.

Almost 400 people responded to a questionnaire Young posted on the Web to research the problem of Net abuse. Of the respondents, only 8% classified themselves as "high-tech white collar" workers. More than half of the respondents were women, despite figures that show that two-thirds of Internet users are men. Young's research also indicated that visiting chat rooms and Multi-User Dungeons (MUDs) is the activity that accounts for the most Internet abuse. Eighty percent of those who admitted having a problem participated in those activities. Surfing the Net or emailing friends accounted for just 20% of Net abuse. Newsgroups and gopher and database search sites accounted for 10%.

Young said that the Net abusers listed three main reasons they needed the Internet: companionship, sexual excitement and to alter their identities. Chat rooms provide companionship to regular visitors, who establish a social group with other regular visitors. In some areas, erotic fantasies can be played out, perhaps involving novel sexual acts, Young wrote.

He said Internet use becomes a problem when people lose control of their behaviour. Some signs of a problem are: loss of interest in other activities, neglecting friends and family, lying about time spent online, and unsuccessful attempts to stop. Despite common perceptions, many people's technological obsessions are a means of personal expression and social interaction. However, there is a minority of people who use technology in a way that is destructive to themselves and others.

Ed Wehde is a writer with Edittech International and is based in Silicon Valley.

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Browser zealots

Isn't it just a browser?

Whether it's Holden versus Ford, Manly versus Parramatta or Netscape versus Microsoft, people always want to believe they are part of a team and, naturally, they want the team to win. But why should a browser — essentially a cleverly arranged string of ones and zeros — be the focus of so much zealotry? Not since the heyday of Mac versus PC (and there was some basis for argument there, especially in the case of Windows 3.x) has the computer world seen people draw a line in the sand and say, 'This is my technology'.

Part of the reason many Net users are divided over their choice of browser seems to depend on when they started using the Net, and what they started using it with. Jon Casimir, in a recent *Sydney Morning Herald* column, made the observation that — according to the *SMH's* Web site log files — IE users are far more likely to click on a banner ad than Netscape users. This observation led him to draw the conclusion that Netscape users were probably more likely to

be early adopters, savvy to the old precepts of netiquette, while IE users were more like the "shiny, disposable income people . . . [the] nice family down the street".

Because of its generalist nature, the *SMH's* reader-base is probably not representative of a broad cross-section of Internet users; *www.consult's* annual Internet use survey, on the other hand, comes closer. The results from its most recent survey show that experienced Net users tend to make their browser choice based on either politics or a rational appraisal of competing products.

Responses to *apcmag.com's* 'What's your browser?' and 'MS IE4 versus. Communicator 4' discussion topics also reflected these factors behind the browser choices of experienced users, with many posts ultimately expressing indifference. For instance: "I have been using IE in its various incarnations at home for a couple of years now and Netscape 3.0 and Communicator at work. In all fairness they are

much of a muchness. That is to say they both chew exorbitant amounts of system memory, they are both unstable."

The other typical response is the political response, which generally runs something like this: "Communicator does what it's meant to. A simple browser. Microsoft's move into the browser market was simply so that they could warp the concept, and start adding all this active channel crap and so forth, simply to take over in the world of content."

So what do you drive? Which team do you support? Why? Often there's no rational basis for these decisions. Maybe your parents always drove a Ford, so you do too. Or perhaps they always voted Liberal, and so do you. This is how it is in the browser market — there's no rhyme or reason for zealotry, people just want something to believe in or be identified with. Either that or they just don't really care.

Josh Gliddon

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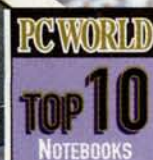
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A look at the technology driving space exploration. By Josh Gliddon

Spaced out

Space exploration and the computer are the equals of the Great Wall of China and the pyramids in terms of human technical achievement. They are also echoes of two other age-old fundamentals: humankind's innate need to conquer the unknown and its constant technical drive in order to do so. In certain ways both, too, have levied a comparable relative human cost.

The ongoing Pathfinder/Sojourner mission to Mars caps the slow creep space exploration has made back into the public consciousness after the Challenger disaster in the US.

The Challenger exploded 73 seconds after liftoff on January 28, 1986, killing its seven crew and destroying public and government confidence in the NASA space program. The USSR space program continued apace, serving primarily the military and propaganda needs of the Soviet state. Its technical innovations were hidden from the rest of the world, and even now, technical information on Russian space programs is difficult to obtain (see 'From Russia with love', next page).

NASA's program before the disaster, while safe and reasonably reliable, was lacklustre — it was perceived as inefficient and expensive. The US budget for the organisation ran to \$13 billion in 1998, and that's a figure that has been steadily decreasing since last decade (comparisons of NASA budgets, as well as budget allocations can be found at ftp://ftp.hq.nasa.gov/pub/pao/FY98_budget).

The radical changes in attitude to space exploration in the past decade can be traced not only to the Challenger disaster, but also the fall of communism. China foreshadowed space exploration several thousand years ago with the invention of gunpowder and rockets, but it still does not figure greatly in the commercialisation of space. This may change as China's attitude to market-style economies changes, and the possibility exists that China could become a significant player in non-



reusable rocket launches in the next century.

The focus has turned towards viewing space not in terms of exploration, but exploitation. Nation-states don't need to use a space program as a tool for primarily military and propaganda purposes, and there is a global drive towards either corporate-style accountability for publicly funded organisations or straight privatisation. The flip side is that there has also been an accelerating trend towards user-pays space exploitation.

The development of computers and microprocessors is a well-known story. More interesting is the white-hot collision point between Moore's Law (the concept that processing power will double every 18 months while the relative price of that power will remain the same), the underlying Western capitalist ideology that drives it, and the associated removal of the Soviet threat. Space becomes simply another expensive commodity driven by market forces.

Since these events took place, public interest in space exploration has gradu-

ally increased again, reflected not only in the mass interest shown in the pictures of Jupiter sent back by Galileo and the images of deep space from the Hubble telescope, but by the resurgence of speculative science fiction on television and in the cinema.

Both space and computing have become public property. The 1969 Apollo 11 mission to the moon was watched on television by millions of people worldwide, all of whom heard those prepared lines from Neil Armstrong. Interest in the Mars Pathfinder/Sojourner mission this year overshadowed that for one simple reason: the ubiquity of the microprocessor. Without processors, the Internet as we know it would not exist. In September this year when interest in the mission peaked, servers at NASA mirror sites logged in excess of 100 million hits. The Net's infrastructure also altered the nature of information consumption; it became two-way and less contrived. You could ask a question of experts at the Discovery Channel, drive a Sojourner mini-rover in VRML at Silicon Graphics, or get telemetry (coordi-

From Russia with love

Mir's recent troubles resembled a space-faring comedy of errors.

First, the computers packed up, began to work again, and then finally died. An unmanned Progress-class freighter punched a hole in the side of the station's Spektr module when Commander Vasili Tsibliyev lost control during a docking manoeuvre. The resulting damage destroyed vital power cables connecting Spektr's solar cells to the station and the Mir's power supply was halved. Meanwhile, the temperature inside Mir dropped, and then the Elektron oxygen generators failed, which forced the cosmonauts to burn oxygen-producing candles. And on it went.

But the seeming farce is not the truth of the matter. Twelve-year-old Mir, by being the longest continually inhabited structure in space — a record set after it had outlived its original five-year design life — can be considered to be among the most successful space missions ever.

The utilitarian approach of the Russians, especially after the collapse of communism and the Soviet Union, is also a significant factor in Mir's success, with one Russian space official saying, "We don't replace anything at the end of its service life. We wait until it breaks and then fix it."

The US government funds the Russian space program to the tune of around \$US400 million per year, and has expressed concerns about the safety of the station; however, it is arguable whether it would have achieved its current level of success without the 'pushing of the envelope' necessitated by the Rus-

sian's straitened financial circumstances. Mir is also a vital link in preparing for the proposed International Space Station, which is set to go aloft sometime early this year.

Construction

Mir has been assembled 'building block' style in stages in space, around the central Mir module which was launched in 1986 and weighs in the vicinity of 20 tonnes. It is divided into living quarters for the crew and system areas for life support and power, as well as a science lab. The core has a docking port at each end for spacecraft, as well as four docking ports arranged radially for expansion modules, the first of which was the Kvant-1 astrophysics module.

The 11-tonne Kvant-1 was launched in 1987, and provides astrophysics capability, additional life support and attitude control equipment.

Kvant-1 was joined by Kvant-2 in 1989. It is divided into three pressurised compartments and is probably the most significant of Mir's expansion modules. Not only does it provide increased crew comfort equipment and life-support systems, but it also has EVA (extra-vehicular activity, a fancy term for spacewalking) capability, and includes significant upgrades for Mir's computing and avionics suites.

The Spektr module is Mir's most recent addition, reaching orbit in May 1995. It was also the module that was damaged by the Progress freighter accident.

The final module is Kristall, which is designed as a pilot area for developing

post-terrestrial material production techniques. Kristall is also unique in that it features folding solar cell arrays that can be deployed when required.

Despite the fall of Communism, information on Russian computing technologies is still extremely difficult to obtain. According to the NASA document *Mir Hardware Heritage* (available for download in PDF format from <http://shuttle-mir.nasa.gov/ops/mir/mirheritage.pdf>), Mir's original computer system was the BTSVK digital computer, also known as the Argon 16B. This machine was developed back in the early '70s and used in the Soyuz T transport ships.

The only information available about the Argon 16B is that it had 16K of RAM and replaced ground-based computer control and paper manuals. Around the same time the Argon 16B came into service, much of the Russian space-fleet's avionics and control systems were upgraded from electro-mechanical to integrated circuit-based units.

The Argon 16B's service was terminated when the Kvant2 module containing the new generation Salyut 5B computer was joined to the central Mir core. The Salyut 5B was jointly developed during the 1980s by two Russian organisations NII TsEVT and NPO ELAS.

After 11 years in space, Mir is set to be decommissioned this year, but unmanned work will continue for some time. Mir's final fate will be the same as that which befalls most orbiting spacecraft: it will be de-orbited somewhere over the Pacific and burn up in the atmosphere.

nates) data, delayed by a mere five minutes.

Space exploration gets cheap

Pathfinder is at the vanguard of a new age of spacecraft that use easily-obtainable commodity parts instead of expensive custom-built equipment. Unlike many previous missions, Pathfinder had a strict cap on its budget of \$US150 million in 1992 — a far cry from the billions spent on previous missions.

It's important to realise that what is commonly called Mars Pathfinder is made up of two parts, the Pathfinder lander and its Sojourner micro-rover, which was

attached to the lander during the descent to the planet and was then liberated to perform remote work. The lander also acted as the base station for the rover, sending and receiving commands and providing it with a docking station during the Martian night. Both also used different, but common, commodity processors and for the lander, an off-the-shelf operating system.

The rover used a 2MHz Intel 80C85 CPU, which is more commonly found in embedded terrestrial applications such as industrial controllers. Space, and the Martian surface, is a far more hostile environment than here on earth, especially in respect to radiation, which has the potential to destroy the processor's circuitry. To

combat this, the rover's logic units were hardened against radiation to what is called class-S, or spaceflight, standard.

The processor communicated with its 672K of onboard memory, as well as with its ancillaries, via a multiplexed 8-bit data and address bus. Of the memory, 48K was radiation hardened and used to store the operating system and application software, which is a custom-written mixture of C and assembler language. The rest was devoted to storage of mission data, which was transmitted to the lander for retransmission to earth.

As the base station for the rover, the Pathfinder lander needed more processing power, so NASA pressed an IBM RS-6000, more commonly found in IBM's AS/400

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servers, into service. Unlike a server, Pathfinder's CPU operated between the snail-like parameters of 2.5 and 20MHz to preserve the reliability of the processor and to minimise the drain on the lander's solar-rechargeable 40A potassium hydroxide batteries. Like the rover, Pathfinder's CPU was radiation hardened by Lockheed Martin, which also built and radiation-hardened the unit's motherboard.

The only area where Pathfinder approached a domestic computer was in its 128M allocation of RAM. While this seems like a lot, it's important to bear in mind that Pathfinder had no mass-storage devices and therefore needed to retain its operating system and mission data in volatile storage. An additional 6M of EPROM is used to store a back-up copy of the Wind River VxWorks operating system, an object-oriented real-time operating system written in C and assembler.

Wind River builds operating systems for embedded applications. It became involved with Pathfinder for the same budget-defined reasons that commercial grade processors were used. An additional reason for the choice of VxWorks is the ease with which it can be ported across to other hardware platforms.

According to NASA, initial development work for the 150,000 lines of code that would eventually become the operating system was done on both AIX and SPARC workstations, as well as a Motorola 68K-based unit. It was then ported across to the RS-6000, a process that will make it easier to port the OS to alternative platforms in the future.

The reality is that space budgets are never going to reach the same levels they did leading up to the 1980s. Coupled with the growing commercialisation of space, and the market imperative to drive down costs, this means the percentage of off-the-shelf parts used in spacecraft is going to increase.

It may not be so far in the future that the space Shuttle has an 'Intel inside' sticker plastered on its side.

Powering into space

Solar cells and fuel cells are the primary sources of power onboard all types of spacecraft. Some, such as satellites and probes like Pathfinder, use solar energy exclusively; manned craft such as the Shuttle use fuel cells, a technology originally developed for the space program back in the 1960s.

Nuclear power, an obvious candidate during the heady days of the space race,

has never been used on commercial or public spacecraft, although military satellites are known to use reactors as power sources. The main reason nuclear power has not been used in the past is that people are uncomfortable about something going wrong on the initial leg of the journey from earth to orbit. Satellites also have the habit of falling out of the sky from time to time, carrying the same threat of radioactive material being released into the atmosphere.

A source which could technically be described as nuclear, but which doesn't involve nuclear fission, is the Radioisotope Thermoelectric Generator (RTG), as used on the Voyager probe, the Galileo mission to Jupiter, and the recent Cassini mission to Saturn. Because of the distance of the outer planets from the sun, the amount of electricity that can be generated using solar cells is not adequate to supply the needs of the mission. According to NASA, solar arrays the size of football fields would be required to power the craft when it arrived at Saturn, which is twice the distance from the sun as its nearest neighbour, Jupiter. Additionally, NASA claims the behaviour of solar cells at that distance from the sun is unknown, and the high level of electromagnetic interference, which is a by-product of solar cell operation, could disrupt the operation of the craft's electronics.

RTGs solve this problem by converting the heat generated by the decay of Plutonium oxide, held in the form of a ceramic, into electricity using thermoelectric generators. The RTGs are insulated from their environment by being split into 18 sections, each of which has its own impact casing. The whole arrangement is then sealed inside an iridium capsule and surrounded by graphite blocks, which provide further insulation. NASA documentation indicates that of the 23 RTG-powered missions flown so far, no failures have been caused by faults in the operation of the RTG.

While it's unlikely that an RTG would be used on a manned craft in the near future, the fuel cell, which was first theorised around 150 years ago by Sir William Grove, provides a solution for relatively cheap, clean and safe space-power. Put simply, a fuel cell is a device that generates electricity by combining hydrogen ions with oxygen atoms using external sources of hydrogen and oxygen-bearing substances as the basis for the reaction. It's the need for an external supply of base fuel that makes fuel cells inappropriate for use on deep-space probes.

A fuel cell's basic topology consists of two electrodes separated by an electrolyte with a sealed vessel. When the hydrogen and oxygen-rich base fuels are introduced to the electrodes, oxygen and hydrogen ions are formed which then travel through the electrolyte and react with the oxygen atoms at the opposite electrode. The net result of this reaction is a current at each electrode, plus heat and water.

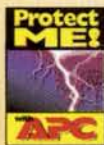
Platinum is typically used for the catalyst on the electrodes, while three different electrolytes are commonly used: phosphoric acid, molten carbonate and solid oxide. The primary differences between the three is the temperature at which the reaction takes place and the energy density of the cell, meaning the relative amount of energy output for a given volume of fuel.

It's the expense of these ingredients that has, until recently, kept fuel cell technology confined to the space program. This is changing with advances in technology that allow the use of significantly less platinum as a catalyst, and new electrolytes possessing the twin characteristics of higher energy density and low reaction temperatures. Companies such as Canada's Ballard are pioneering the development of these cells, which theoretically could one day see homes with their own fuel cell-based power-generation systems. Some large corporations and institutions, such as hospitals in North America, are already using this technology with success. As their size and expense falls, fuel cells also have potential as power supplies for cars and trucks. Mercedes-Benz and Toyota have pioneered work in this area, Mercedes-Benz has demonstrated fuel cell and powered commercial vehicles.

The third option, solar or photovoltaic cells, generate power by converting energy from the sun, in the form of sunlight, into electricity. A solar cell is a sandwich that typically consists of two layers of semiconductors — in Mars Pathfinder's case the semiconductor is gallium arsenide — between non-reflective outer layers. Electricity is generated when a photon from sunlight hits the semiconductor and dislodges an electron, transferring its energy to that electron and allowing it to take part in the circuit formed by the sandwich. In theory, the Sun is a great energy source for spacecraft; it's pretty much always there and it's free. The downside is that solar cells are very inefficient at converting available energy into usable energy, which is why Cassini would have needed football-field-sized solar panels to do the job.

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According to the US Department of Energy, early cells were about 3% efficient, while modern cells top 17% efficiency. Contrast this with the 3% efficiency of the combustion engine in your car, and solar suddenly looks pretty attractive. There's one problem, however: 30 litres of petrol has a much higher energy density than would a solar panel covering the entire outside surface of the vehicle. This means that while petrol is far less efficient in ultimate terms, it is more efficient and far cheaper in practical use. The improvements in efficiency come from two areas: better semiconductors and better engineering that allows a greater number of photons to find their electron mark.

The power sources used in space basically come down to the appropriateness of application, and until cold fusion is invented, these three sources will remain the backbone of space power generation.

Space Shuttle: World's biggest firework

When you're sitting atop the world's biggest firecracker, the term 'mission critical' takes on a whole new meaning. When part of that firecracker has to come back to earth in one reusable piece, those mission-critical systems had better be robust.

The Space Shuttle, or to give it its NASA name, Space Transport System (STS), naturally relies heavily on its onboard computers for the safe completion of its mission. If something decides not to work, there needs to be a backup; if the backup doesn't work, then there has to be yet another back-up system. In the case of the Shuttle, mission-critical means being able to get back to earth safely with twice-failed systems. The Shuttle's systems allow the craft to function automatically, with the exception of manoeuvres requiring the crew to provide input to the control system, such as mid-space docking and landing on the craft's return to earth.

The Space Shuttle's onboard system consists of five IBM AP-101S general-purpose computers (GPCs) that in turn supervise 300 electronic black boxes whose functions vary according to their assigned task. A triple redundant common-data bus connects these together. If the entire system was removed from the craft it would weigh 7,500kg and the associated wiring would stretch three times between Newcastle and Sydney.

The fascinating thing about the Shuttle's GPCs is their age. The original AP-101, the B model, was developed in 1972

for the Shuttle and served until 1984 when a new design, the S, was commissioned.

The primary difference between the two specifications is their physical architecture. The B series consisted of a separate CPU and an input/output processor (IOP) made up of 24 sub-processors that communicate with the craft's systems via 24 individual serial buses. Sitting between the IOP and data buses is a multiplexer interface that checks, validates and passes on system calls.

When you're sitting atop the world's biggest firecracker, the term 'mission critical' takes on a whole new meaning.

Both the IOP and CPU units physically have their own memory which is viewed as a unified memory space by the CPU, which also controls access to it.

The S series consists of a single box containing both the CPU and the IOP. Additional upgrades have increased available memory by 250% from 104,000 32-bit words to 256,000 32-bit words, while the physical changes mean that the entire GPC weighs 29kg. Performance enhancements have also improved the GPCs' operational speed from 400,000 operations per second to 1 million operations per second, while still using the same basic software.

Unlike your home PC, the Shuttle's GPCs use real-time code developed in a language called HAL/S (high-order assembly language/Shuttle). The advantage of using assembler language lies in the speed of operation, as it reduces the layers of abstraction between the silicon and the software. The disadvantage is that assembler is difficult and time-consuming to write and debug.

Shuttle software is divided along a strict line of demarcation: system software and applications software. Application software takes care of all the 'Shuttle-stuff'; that is, it controls vehicle guidance, payload management, and engine management. System software takes care of everything else, including the flight operating system, computer resources and human interface resources. Overall, the system software acts in much the same way as the desktop operating system of a domestic PC.

It's the efficiency of this software that allows the use of computers that would be called 'legacy' in a terrestrial application; however, the limitations of the computers also necessitate removing as many levels of

abstraction between the system and the silicon as possible.

Space Shuttle's mass storage system also hails from the pre-dawn of computing. Instead of hard drives it uses twin half-inch tape drives, each with 34M of total storage capacity. Each tape is divided into eight tracks with an additional control track, and each track is subdivided into functional groupings corresponding with the mission profile software.

Like virtually everything else in spaceflight, these units were chosen over other storage media primarily for their reliability in what is a fairly harsh environment. As an additional measure to improve reliability, both units are cooled via plates attached to a liquid cooling loop.

Each unit communicates with the GPCs via the same serial bus used by the rest of the system and is interfaced with the same multiplexers described above.

Completing the Shuttle's computing systems are the output devices, the central point of which is the human interface devices. In the Shuttle's case, human interface is achieved through three 13 by 18cm multifunction CRTs at the forward flight deck and an additional one mounted aft of the flight deck. These units display all input from the keyboards, as well as all other system data. The screens for the CRTs are preserved in the tape units for immediate reboot.

Can you imagine a time before Velcro, Glad Wrap, aluminium foil or Space Food Sticks? All these products were originally designed to perform certain functions in space, and later found lives worlds away on earth. Rather than signalling an end to this level of innovation, the growing commercialisation of space means that a greater number of products can be developed for, and in space: new medicines, ultra-pure crystals and superfine circuitry are all well within our reach through space exploitation. Who knows what quantum leaps in computing will contribute to the space effort, and conversely, what the space effort will give to computing? For space is no longer the greatest challenge, the highest peak. It is now the golden west, the new and reachable frontier. ■

Power-hungry notebooks are reaching their limits. **By Selina Mitchell**

Power play

Just how much power consumption can a notebook take? The answer is not much more, according to Intel, the manufacturer of the majority of processors used in notebook computers. The buzz at the moment is that the latest improvements in notebooks make them great desktop replacements. That may be a good thing, reported a *US PC Week* columnist cynically — with all of these features, and their toll on battery life, they will no longer make very good portable PCs anyway, he said.

Battery technology has not increased at the phenomenal rate at which all other components have progressed; it is being strained by the next generation of power-hogging features and faster processors being added.

"Developers of notebook computing are constantly trying to push the envelope and get more speed and more power," said IDC analyst William Christie. "It is the technology push that is driving the product and its sales. If we continue to drive the technology the way that we have been, battery life will become a problem."

But the bigger problem, according to Intel, is heat. Notebook manufacturers and developers need to reduce the power consumption of watt-hungry features if systems are going to keep up with user demand for better performance and an increased feature set without over heating.

The power and heat dissipated internally by a full featured notebook increased by 90% over three years to 19W in 1997, said Intel at a recent power management conference. It predicts power consumption could reach 35W by next year. Notebooks of this era won't be able to dissipate any more than 23W to 25W, as the cooling techniques used to remove internal notebook heat will not keep pace with enhancements in other areas.

Intel is introducing technology to cut back processor power consumption and heat creation. It believes more must be done by suppliers of components and software to ensure future notebook dream machines remain within the limits of established thermal technologies. This will also ensure continued profits from laptop sales.



The effort so far

Intel Pentium Pro and Pentium II processors, with their high voltage requirements, are considered too power-hungry for notebooks. In an attempt to continue to increase notebook processor performance without detrimental impact on battery life, Intel designed its latest mobile Pentium MMX chips to keep power usage to a minimum. Notebooks with these processors (see reviews in *APC* January, page 82) require just 1.8V of power. A Pentium MMX chip uses a 2.8V and a Pentium uses 3.3V. Intel manufactures the processor using 0.25-micron technology, which reduces the die size of the processor and effectively means that electricity has less distance to travel, thus requiring lower voltage. Lower voltage means lower power consumption.

The 0.25-micron notebook version of the Pentium II (codenamed Deschutes) may have been introduced by the time you read this. The chip is expected to cut power consumption to below 10W and make portable Pentium II systems practical. So, Intel believes the processor side of the equation is relatively under control, and it's time for other players to help reduce a notebook's total power consumption.

Last September, Intel hosted a Mobile Power Symposium, where it outlined to industry its vision for future notebooks: a combination of high performance, strong features and power efficiency. To achieve

this goal, Intel announced the Mobile Power Initiative, a program it hopes will be supported by system manufacturers, component suppliers and software vendors. The initiative is being backed by companies such as IBM, Toshiba, Compaq, Microsoft, Dell, NEC, NeoMagic, Lotus, S3 and Cirrus Logic.

The initiative's programs cover three areas. The first is the computer system itself, which includes all hardware components. Intel's Mobile Power Guidelines set out power and voltage targets for component manufacturers and suggest some implementation ideas and design considerations. They are not a list of procedures or processes to cut power.

The second area covered is operating system power management. The aim here is to ensure that the OS has control over power consumption management. The main tools offered to help are: the Advanced Configuration and Power Interface (ACPI), an open specification developed by Intel, Microsoft and Toshiba for all hardware including system hardware, device subsystems and peripherals connected to the system via an external bus; the Smart Battery System, developed by Intel and Duracell for more accurate battery-life readings; and the Intel Power Analyst (IPA), which allows developers to measure just how much power each component is using when power-saving features are activated. The IPA software shows which subsystems are drawing the

most power, and the correlation in power consumption between all subsystems. Data can also be used to help identify idle subsystems that can have power reduced.

The Intel Power Monitor and Mobile Software Guidelines have been developed to deal with the third area of the initiative, optimisation of power used by installed software. Software can be optimised to conserve power by eliminating loops and sequences that prevent the system from going into low-power states, and by optimising software design, said Intel. The Power Monitor was designed to gauge and display system activities so developers can determine which programs are wasting power.

Intel identified MPEG-2 movie playback as the worst power application it tested in 1997 — it consumed 18W of power. The second worst offender was Microsoft Word 7.0, which consumed 16W. MPEG-1 was another notable power-hungry application, consuming about 14W. Intel said 3D games are expected to be the most demanding applications for power consumption in 1998 and 1999.

Guidelines galore

Intel released the Mobile Power Guidelines

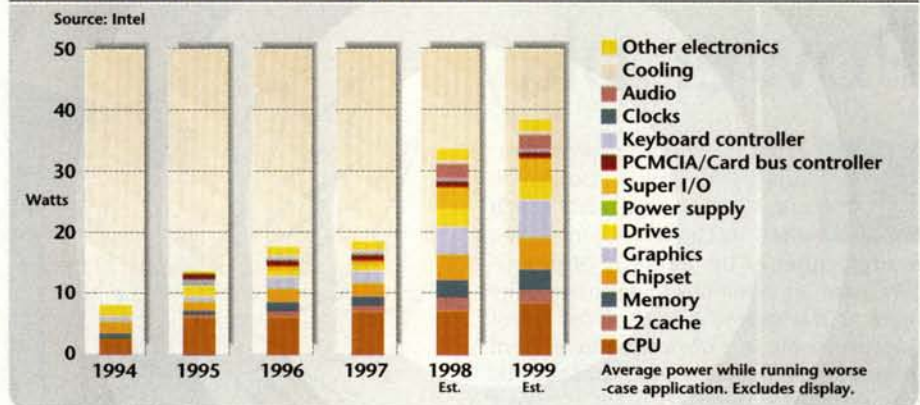
'99 late last year. If these guidelines are followed, Intel said, by 1999 a relatively high-end notebook computer will have an average battery life of three hours. The goal is to keep the power consumption of a notebook computer down to 22W (an average 1988 notebook will use about 30W, unmanaged, according to Intel). To do this, it has proposed power targets for each notebook subsystem to be achieved with industry coordination.

Intel predicted that the 1999 system configuration would include a mobile Pentium II processor or next-generation chip, 512K of pipeline burst L2 cache, a 13.3in screen, 64M of RDRAM, an AGP graphics controller with 4M, 3D acceleration, TV-out, one 1394 port, a USB port, support for CardBus and more.

Gartner Group and IDC analysts agree with most of Intel's configuration projections. William Christie, an analyst from IDC, said it was a feasible configuration, but some notebooks would contain more high-end features. Gartner's Bruce McCabe suggested the average display size would probably be closer to 14in.

In its guidelines, Intel said voltage reduction was the most significant method for reducing power. It has proposed mobile component core voltage targets for

Unmanaged notebook power trends



1999. It suggests, for example, lowering the memory controller from using 3.3V to 1.8V; the system memory from 3.3V (EDO/SDRAM) to 2.5V (RDRAM); I/O component core voltages to 2.5V; and the CardBus controller from 3.3V to 2.5V.

Unfortunately, the guidelines don't supply much detail on how to reduce power consumption, but they do include some hints on design configuration. "As well as reducing component voltages, integrated circuits can be made more power efficient through design optimisation," according to the guidelines. "During integrated circuit design, benchmarks can be developed to identify where power is being consumed on a unit-by-unit basis. Once the power distribution profile is characterised, low-power design techniques such as gating the clock to unused sections of circuitry, or reducing the number of nodes toggling for a given operation can be implemented. Buffer design can also be optimised to reduce power by not overdriving signals."

The Intel guidelines state that the graphics subsystem performance can be increased in 1999, but still meet the power target of 3W peak power. It suggests the following power reduction techniques: the reduction of the graphics controller core voltage to 1.8V; integrating the frame buffer, gating the clock to unused sections of circuitry; and dynamically changing the 3D acceleration clock to allow high performance when needed and low power when the system reaches a thermal limit or low battery constraint.

To reduce flat panel display power, the guidelines suggest: reducing display logic voltage to 3.3V, reducing the refresh rate when the image is static, improving the aperture ratio, increasing lamp and light spreader sheet efficiency by using Brightness Enhancing Films, and by improving panel driver and controller and CCFT

inverter efficiency.

FireWire (1394) devices present special power problems, due to the high power consumption of the interface and the bus requirement to keep all bus nodes active as bus repeaters. Intel suggests it may not be suitable for mobile systems.

Audio subsystem power can be reduced by reducing the digital accelerator from 3.3V to 2.5V; reducing analog codecs from 5V to 3.3V; balancing audio processing between hardware and software; and increasing amplifier and speaker efficiency.

Intel suggests CardBus could reduce active power by moving the core voltage to 2.5V. Idle power could be reduced by internally gating the PCI clock when no cards are detected, said the guidelines. Intel and Compaq are co-chairing a PCMCIA committee examining CardBus power management.

But will it work?

While Intel, and its partners, are committed to lowering power consumption as part of the solution to heat problems, some analysts, such as McCabe, believe there are other issues that also need to be addressed. "I see it a bit differently to Intel," he said. "It's not so much a power management issue as a battery issue. Improving battery technology is difficult, slow and expensive, but it will get better. It is hard to lower power consumption without affecting usability."

The Intel initiative has the support of many industry parties, but MIS managers are concerned by some of the guidelines. Suggestions in the document to turn off the autosave features in an application, reduce the frequency of saves, and to disable the Windows Plus back-up features, raised eyebrows.

IDC's Christie was not sure how Intel would enforce its guidelines. "Intel will not be able to convince manufacturers to stem or trim their technology," he said. "They want

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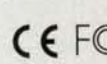
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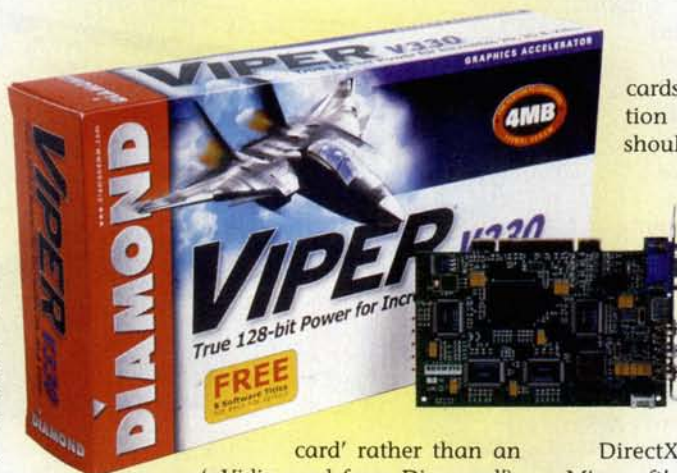
If your games are suffering from a lack of serious butt-kicking 2D/3D grunt, now is the time to upgrade. By Nathan Taylor and Lachlan Botticchio

Big guns

In the space of just over a year, the consumer graphics-card industry has been revolutionised. The release of the 3Dfx Voodoo chip in October 1996 was the catalyst for the inclusion of 3D graphics in consumer PCs. Since then, the quality and quantity of high-performance 3D accelerators has been immense. Combination cards, which provide high-performance 3D with at least reasonable 2D performance are now readily available at affordable prices.

Look to the chip

As a rule, the best practice to follow when choosing a 3D accelerator is to know which chip you want, and buy a board with that chip on it. Few graphics card vendors actually design and use their own chips nowadays. Most buy chips from chip developers such as NEC/Videologic, 3Dfx, nVidia,



card' rather than an 'nVidia card from Diamond'), but savvy graphics card buyers came to the realisation that the graphics processor, rather than the card, was the primary determinant of performance. As a result, graphics card vendors will now usually disclose the chip used by the card, allowing knowledgeable buyers to decide which is best for them. Knowing that two cards with identical chips will probably offer about the same performance can save the clever buyer quite a few dollars when hunting for a graphics card.

There are also other factors to take into account. Well-written drivers and BIOSes can increase the performance of a graphics card by 15% or more, as demonstrated by the difference in the results between the cards based on the nVidia Riva 128 and Permedia II chips. Also, certain capabilities may or may not be switched on in some cards; the Riva 128

has built-in TV-out capabilities, for instance, but not all cards take advantage of this. Software bundles can also affect the value of certain cards.

Know your APIs

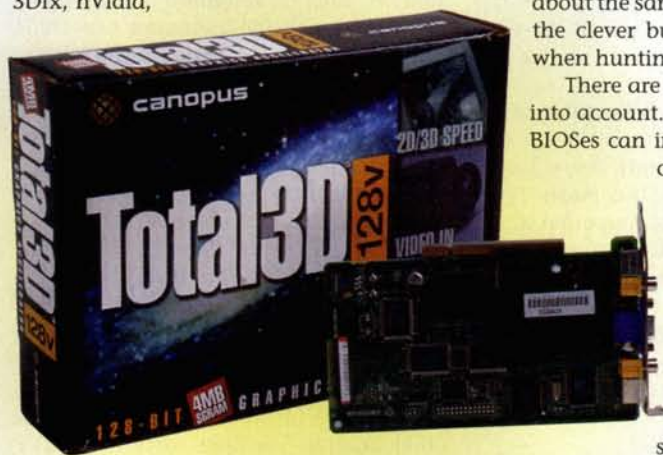
When it comes to consumer 3D graphics

cards, there are three APIs (application programming interfaces) you should know about: DirectX, OpenGL and Glide. These APIs provide a means for developers to write applications that work across a range of graphics cards, rather than a single device. From the developer's point of view, they also make writing 3D engines much easier.

DirectX, currently in Version 5.0, is Microsoft's API for games, and works only under Windows 95 and NT. All the cards in this review support DirectX, and at one point the software industry was well on its way to standardising on DirectX for programming games, despite a number of technical deficiencies. This would have been great for Microsoft because DirectX games cannot be easily ported to other platforms. One games company, however, decided that it would take an alternative route; it selected SGI's OpenGL as the best API for its games, and standardised on that platform.

Under normal circumstances, this would not have had a great effect on the gaming market, but, unfortunately for Microsoft, the company was id Software, the developer of some of the biggest-selling games of all time, including Doom and Quake. Quake, and the growing number of titles using the Quake engine, support OpenGL exclusively for 3D acceleration (if OpenGL is not present, then Quake will use software emulation for 3D functions). As a result, quite a few vendors of graphics cards have written OpenGL drivers for their respective devices, and can get the full benefits of the 3D acceleration offered by the card. If there are no OpenGL drivers for the card, then OpenGL applications (such as Quake) cannot take advantage of the extra features of the card.

The third main game API is 3Dfx's Glide. Despite its proprietary nature, Glide



Trident, Rendition, 3D Labs or S3. The primary exceptions are Matrox, ATI and Number Nine, and even they have begun using third-party chips in some of their product lines.

Even a year ago, graphics card vendors promoted their own brand over that of the chip used (that is, you bought a 'Diamond

has been used in a number of games. To take advantage of the performance increases offered in games written for the Glide API, you must have a 3Dfx card — Glide drivers only exist for 3Dfx-based devices, of which there are none in this review.

2D performance

Up until nVidia released its Riva 128 chip, getting a decent 2D/3D graphics subsystem was a matter of compromise — some cards offered great 2D performance, but 3D performance was poor, and others offered respectable 3D performance but poor 2D performance. For quite some time the only way to get the best of both worlds was to buy an add-on 3D-only card, such as a Voodoo-based card, to go with your fast 2D card. But this was costly, consumed a valuable PCI slot and used a video overlay technique which slightly reduced the quality of the video output and prevented 3D graphics from running in a window.

3Dfx tried to rectify the situation with the release of the Voodoo Rush chipset, which was designed to work with a third-party chipset to provide an all-in-one solution. Voodoo Rush failed to live up to expectations, offering lower performance than Voodoo and having problems running some 3D games. As a result, very few cards use Voodoo Rush (Hercules and Jazz are the only notables), and these are usually avoided by serious gameheads.

In our review, the best 2D performer was Number Nine's expensive Revolution 3D card using the Ticket to Ride processor, closely followed by the nVidia-based cards (particularly the Diamond Viper 330) and the Diamond Fire GL. The ATI cards also performed reasonably well, as did the Creative card. Of all these cards, however, only the nVidia cards continued their good form into the 3D tests.

However, 2D performance has become decreasingly important — all the truly demanding games and applications are based around 3D graphics, with 2D graphics primarily used for Windows-based applications (such as office suites, which have never demanded much from the graphics card) and older games. The faster CPUs available now will generally compensate for poor graphics card 2D performance, making the 2D aspect of the card ever less relevant.

3D performance

From our test results, it is quite clear that, for the moment at least, the Riva 128 chipset is the pinnacle of 3D performance when it comes to consumer combo 2D/3D cards, offering performance levels 20% to 25% faster than its nearest competitors in the WinBench 98 Direct3D tests. Combine this with its excellent 2D performance, and you have one very



powerful chip. A card using this chip also topped the table in the OpenGL-based Quake II test, although this was a different card to the one that topped the WinBench 98 table, showing the value of well-written drivers. One interesting result in the Quake II test was the impressive scores of the Apocalypse 5D from VideoLogic, which unfortunately did not have drivers capable of running the 3D WinBench 98 3D WinMark test properly. Four of the cards did not have OpenGL drivers for Windows 95, and so we were unable to run this test on them.

High frame rates are a desirable feature but not the only important factor to look for in 3D graphics cards. If you look at the specification tables on pages 116 and 117, there is a list of supported and unsupported 3D features for each graphics card (as determined by the WinBench 98 benchmark). The more features a card supports, the better the image quality is likely to be, although some features are more important than others.

What's coming up

The graphics card industry is very much holding its breath, waiting for the Intel 740 graphics processor (codenamed Auburn) to hit the market. Although according to early reports the performance of the AGP chip is not *that* spectacular (performance levels about equal

to an nVidia Riva 128 are anticipated) and it suffers from heat problems (being manufactured with 0.5-micron technology), the fear is that Intel will sell the processor at prices that are artificially cheap, squeezing a number of other players out of the market. The other concern is that the chip is designed to be embedded on motherboards (and possibly sold with Intel's chipsets), alleviating the need for a third-party graphics card.

Graphics chip vendors are not just sitting on their hands awaiting defeat, however. Numerous new chips are in the works, the best known of which is the Voodoo2 from 3Dfx, a 3D-only chip (like its predecessor, the Voodoo) designed to operate in conjunction with a 2D card. According to 3Dfx, the Voodoo2 triples the performance of the immensely popular Voodoo chip while retaining backward compatibility (for a review of the 3D-only Voo-doo card, see APC May, page 147).

nVidia is also rumoured to be working on an upgraded version of its chip, expected in Q3 or Q4 this year. This card is expected to be able to address at least 8M of memory, overcoming the greatest criticism of the Riva 128 chip — the 4M memory limitation. NEC should also be manufacturing its next 3D chip, the rumoured Power VR3 chip. Other chip vendors, such as Rendition and 3D Labs, are also expected to announce new chips this year, at double or triple the performance of current generations.

Perhaps the dark horse in the 2D/3D realm in the next year is 3Dfx, the company which dominates the 3D-only market. Towards the end of this year (and possibly later, depending on whether it can stick to its schedule), 3Dfx should release its 'Banshee' processor, which the company expects to equal the performance of the Voodoo2 while offering native 2D performance.

Other things to look for over the next year will be increased integration with other graphic functions such as MPEG-2 decompression and television tuning (companies like Quadrant and ATI will be notable in the next year in this space) and an increasing shift towards AGP as the primary graphics bus. This will be accelerated by the release of Windows 98 and NT 5.0, which will properly support the standard.

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Xpert@Play

ATI

Xpert@Play is a multimedia card aimed at gamers. Its price and performance are both average in comparison to the other accelerators in this review.

The card submitted to APC used 4M of SGRAM, which is expandable to 8M for improved performance. This product has S-Video and composite video-out, which allows you to connect the card to a VCR or TV.

Xpert@Play is packaged with two games (EIDOS Interactive's Terracide and Psygnosis' Formula 1 — both optimised for the Xpert's ATI Rage Pro processor), the ATI installation disk, and the cables needed for the video connectivity. ATI's AMI connector, which can be used to upgrade with the ATI TV or DVD options, sits on the board itself.

This card did not manage to top any of our performance charts. Its best result was in our 2D Winstone 98 Business Winstone test, where it gained a fourth-placing score of 20.7 in a tightly packed field. The Xpert@Play, and its more sophisticated counterpart Xpert@Work, could not be included in our Quake II Windows 95 OpenGL tests, because ATI had not released the appropriate drivers at the time of testing. However, the Xpert@Play is fully OpenGL-ready when used under Windows NT. When we looked at the 3D Windows 95 performance using the 3D WinBench test, the Xpert@Play's 254 was almost 40 points below the average for the group.

■ **Distributor** BBF Components & Peripherals
 ■ **Phone** (03) 9761 4299
 ■ **Online** <http://www.atitech.com>
 ■ **Price** \$399

■ **Distributor** Servex
 ■ **Phone** (02) 9870 1999
 ■ **Online** <http://www.atitech.com>
 ■ **Price** \$349
 ■ **In short** Not a spectacular performer; however, this card has expanded video capabilities and is reasonably priced.

Xpert@Work

ATI

The Xpert@Work is basically the same as the Xpert@Play, but is aimed at the professional graphics market as opposed to the game-playing market.

We took a look at the 4M version of the Xpert@Work. Up to 8M of SGRAM can be installed onto the card. Both of the ATI cards use a DIMM upgrade slot to accommodate

extra memory. The 230MHz RAMDAC works in conjunction with the ATI 3D Rage Pro processor to provide satisfactory performance in both the 2D and 3D arenas. The Xpert@Work does not come with the video connectors found on the Xpert@Play card. Instead, ATI bundles some heavy 3D applications with this card. These include Micrografx's Simply 3D, MGI's PhotoSuite SE, Wirl by Vream, as well as a sampler CD.

The Xpert@Work's performance was almost identical to that of the Xpert@Play, with the exception of the WinBench 98 High-End Graphics WinMark. This test runs high-end applications, and shows the Xpert@Work's drivers are better tuned, delivering a respectable fifth-place score of 136. However, like the Xpert@Play, its 3D performance under Windows 95 was below average. This card can also be upgraded with ATI's DVD, TV or MPEG-2 options.

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 ■ **In short** An entry-level 2D and 3D accelerator for graphics professionals.

Total3D 128v

CANOPUS

Canopus products are a recent import into the Australian market. This review marks their first appearance in APC.

The Total3D is a gamer's dream with strong 3D performance and video-in and TV-out capabilities. At the heart of Total3D is the Riva 128-bit processor. It is backed up by 4M of 100MHz SGRAM and a 230MHz RAMDAC. Unfortunately, the Canopus card will not extend beyond the 4M limit, therefore limiting possible resolutions in 2D and 3D.

Canopus has included two custom video applications (V-Shot Photo Grabber and Total Cinema EX), to provide users with the tools to edit home movies. To further extend the gaming environment, the Total3D's TV-out jack connects computer graphics to a standard TV so you can play games on bigger screens. Also provided with this card is Kai's Power Goo SE, Micrografx's Simply 3D 2 LE and Picture Publisher 7 LE, Platinum's VR Creator/Learning Edition, and a number of demo games.

While not endowed with super 2D



EDITOR'S CHOICE

● **Diamond Viper V330**

HIGHLY COMMENDED

● **Canopus Total3D 128V**

BEST VALUE

● **Diamond Stealth II**

The Diamond Viper V330 offered great 2D performance without compromising its 3D achievements. Its 3D WinBench 98 3D WinMark result of 436 gave it a comfortable lead over every other card in the review. It has video capabilities and a number of software titles are included in the box.

Similarly, the Canopus Total3D 128V (priced at \$449, the same as the Viper V330) excelled in 3D performance. It screeched ahead in the real-life Quake II test where it supported 41.5 frames per second, while its nearest competitor achieved 37.3 frames. (Its 2D performance, however, was not as impressive.) The Canopus card also has video capabilities and is bundled with video editing software.

Another Diamond card, the Stealth II, provided fair performance and proved great value at \$269. The card has a number of upgrade options available, including DVD and TV tuner, and comes with a stack of great titles to boot.

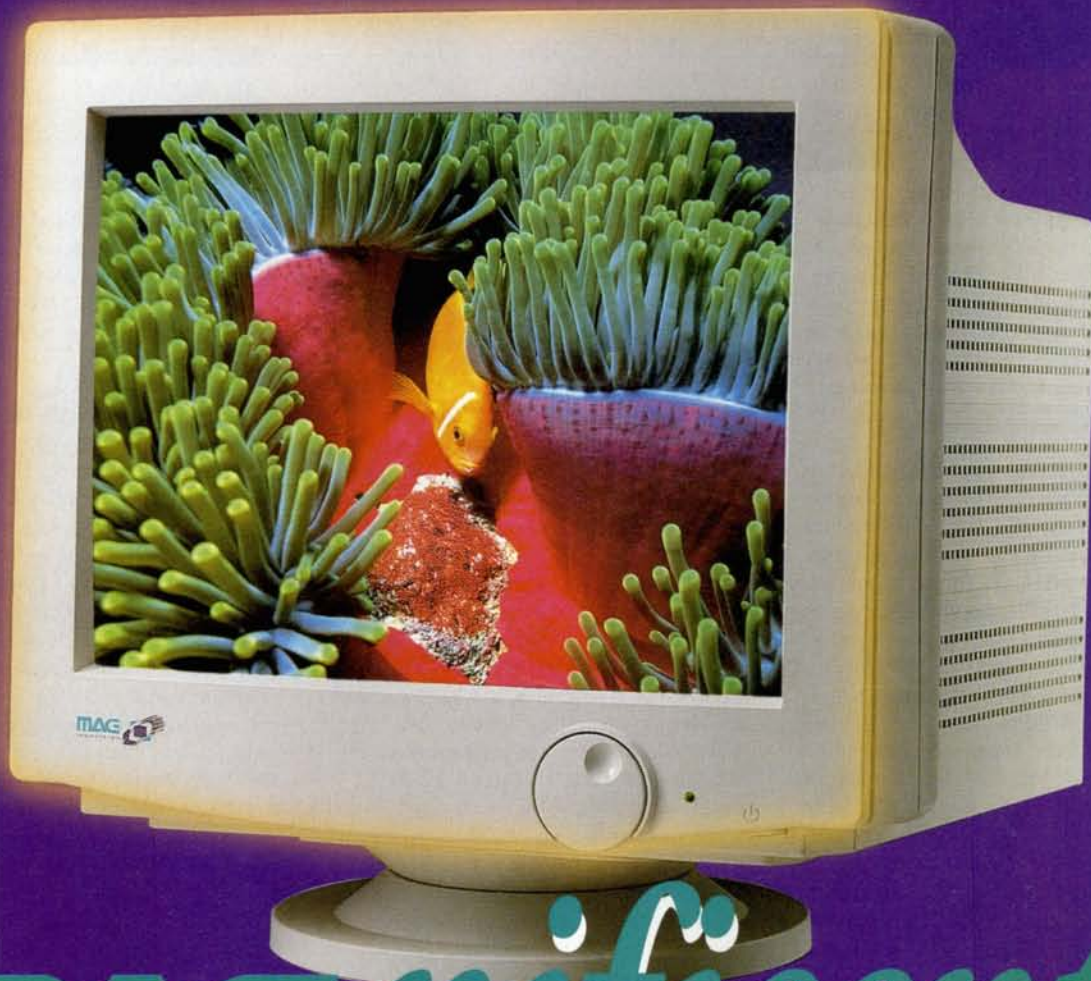
performance, the Total3D was the top product in this review. Second only to the Diamond Viper in the 3D WinBench 98 3D WinMark test with a score of 417, its performance running Direct3D applications was impressive. Under Quake II, the Total3D blitzed all competitors, pumping out OpenGL 3D at 41.5 frames per second. At \$449, this card will be on every gamer's wish list.

■ **Distributor** Creative Pacific
 ■ **Phone** (02) 9906 8887
 ■ **Online** <http://www.canopuscorp.com>
 ■ **Price** \$449
 ■ **In short** A gamer's dream with blistering 3D performance.

Blaster Extreme

CREATIVE GRAPHICS

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card in the form of the 3D Blaster. Now, Creative has chosen the Permedia II processor to power its new line of accelerators, dubbed Graphics Blaster Exxtreme.

We tested the Exxtreme with 4M of SGRAM and a 230MHz RAMDAC (to convert the digital signals to analog output). While the Permedia II processor from 3Dlabs is designed with Windows NT OpenGL in mind, it does provide fair performance under Windows 95 using the DirectX APIs.

Our benchmark tests produced a mixed bag of results for the Exxtreme card. In both of the 2D Graphics WinMark tests it came fourth behind the Number Nine Revolution 3D, Diamond Viper 330 and Diamond Fire GL 1000 Pro cards. In the 3D tests, it did not prove as successful, coming below average in the 3D WinBench 98 3D WinMark and coming last in the Quake II Windows 95 OpenGL test with only 22.2 frames per second.

The Exxtreme card is packaged with Electronic Arts' Moto Racer, Creative Graphics' Inspire and Enhanced BlasterControl, Platinum's VRCreator, and Wirl (both 3D Internet utilities), and a software MPEG player. It also has two expansion connectors to add future TV, video and DVD add-ons.

- **Distributor** Creative Pacific
- **Phone** (02) 9906 8887
- **Online** <http://www.soundblaster.com>
- **Price** \$299
- **In short** An inexpensive card, but not a great performer.

Fire GL 1000 Pro

DIAMOND

When Diamond acquired SPEA Graphics, it inherited the renowned Fire GL range of OpenGL Windows NT graphics accelerators.

Diamond Fire GL is a balancing act between mass-market consumer affordability and high-end OpenGL processing. Powered by the 3Dlabs Permedia II processor, the Fire GL was one of only three cards in this review to come equipped with 8M of RAM. This is reflected in its maximum resolution of a whopping 1,920 by 1,080 pixels at 65,000 colours, while ticking along at a refresh rate of 75Hz.

The software included in the box is very developer-focused, consisting of titles such as Crystal Graphics' 3D Impact, Cosmo Player 2.0 and Caligari's TrueSpace3 SE, as well as Diamond's AutoCAD utilities, Big Focus and 3D Win. Developers using the StereoGraph-

How we tested

We used two distinct categories of tests. We tested the 2D acceleration used in everyday Windows applications, and the 3D acceleration used in DirectX games and OpenGL applications.

2D tests

Winstone 98: Business Winstone

Winstone 98 is the new version of the Winstone benchmark from Ziff-Davis. Winstone runs a script of popular Windows 32-bit applications and times how long the PC takes to execute the script. We used Winstone 98 to test how the graphic cards affected the overall performance of the system.

Winstone is split into two tests, High-End Winstone and Business Winstone. The applications that Winstone 98 uses for these tests are Netscape Navigator, CorelDRAW 7, Microsoft PowerPoint 97, Microsoft Access 97, Microsoft Excel 97, Lotus 1-2-3 97, Corel Quattro Pro 7, Microsoft Word 97 and Corel WordPerfect 7.

We ran both the Winstone and Graphics WinMark under conditions we determined were typical of the average PC user. Our Winstone 98 tests ran at a resolution of 1,024 by 768 at a colour depth of 65,000 and a refresh rate of 60Hz.

WinBench 98: Business and High-End Graphics WinMark

The WinBench 98 Business and High-End Graphics WinMark test profiles the graphic calls that are produced in the Business and High-End Winstone application tests. The Business Graphics WinMark tests measure how the cards perform when executing common business applications. The High-End Graphics WinMark tests graphics performance for the following professional programs: MicroStation 95, Adobe Photoshop 4.01, Adobe Premiere, AVS/Express 3.1, PV-Wave 6.1 and Microsoft FrontPage 97. We ran both the High-End and Business WinMark tests at a resolution of 1,024 by 768 at a colour depth of 65,000 and a refresh rate of 60Hz.

3D tests

3D WinBench 98: 3D WinMark

The 3D WinBench 98 3D WinMark tests measure the performance of all of the components within a PC's 3D graphics subsystem. These components include DirectX3D software, the monitor, the graphics adapter, the graphics adapter drivers and the bus that transports the data between the graphics subsystem and the main processor.

We tested our cards at settings which would reflect common settings used in DirectX applications such as games. Our DirectX3D tests ran at a resolution of 640 by 480, a colour depth of 65,000 and a 60Hz refresh rate.

Quake II Windows 95 OpenGL test

Quake II from Activision (<http://www.activision.com>) and id Software (<http://www.idsoftware.com>) is a 3D shoot-'em-up that uses a subset of the OpenGL API to perform the intensive rendering needed for the game. Quake supports software emulation for video cards that do not supply OpenGL drivers. Most of the new cards being released onto the market are being provided with OpenGL clients for Windows 95. We were interested in how many frames per second (fps) these cards could manage at a resolution of 640 by 480. We performed the test by making sure the correct OpenGL drivers were installed. We then enabled the OpenGL acceleration within Quake and started a new game. Once the game had loaded we typed `timerefresh` at the command line. This command times how the card handles a complete 360° view around the player. The more frames per second, the better looking and smoother the display. We tested under Windows 95, but users who can afford an NT system will enjoy greater benefit from NT's superior OpenGL implementation.

Testing environment

All of the cards that APC reviewed in this feature were tested on a single system.

The system's specifications were:

- APC custom system, a single Intel Pentium II 233MHz processor, 64M of RAM, 512K secondary cache, IBM 9G DCHS Ultra Wide SCSI hard disk, Adaptec 2940UW Ultra Wide SCSI disk controller, FAT file system and no hardware disk cache;
- Windows 95 OSR2 using system cache with access to all available memory.

To obtain our 3D WinBench 98 scores in the 3D WinMark tests we set the following settings for all cards: Direct 3D HAL, MMX emulation, 640 by 480 pixels, 16-bit colour, full screen, execute buffers. All products used in this test were shipping versions available to the general public.

These tests were performed without independent verification by Ziff-Davis, and Ziff-Davis makes no representations or warranties as to the results.

Lachlan Botticchio

ics standard can plug 3D shutter glasses into the Fire GL 1000 Pro to view images in 3D. It comes with DirectX, OpenGL and Heidi drivers, and works with Windows NT 3.5 and 4.0, and Windows 95.

As a 2D Windows accelerator, the Fire GL 1000 Pro was impressive. In all three of the 2D GUI benchmarks, this card came in the top three places. While not at the very top, it scored 260 in the 3D WinBench 98 3D WinMark under Windows 95. The Fire GL's engine is optimised for Windows NT OpenGL, but it managed 22.6 frames per second in the Quake II OpenGL subtest. The Fire GL 1000 Pro is available in both AGP and PCI versions and we recommend it for the workstation professional.

- **Distributor** Chips and Bits
- **Phone** (02) 9696 1911
- **Online** <http://www.canopuscorp.com>
- **Price** \$549
- **In short** A workstation card with great 2D Windows performance.

Stealth II S220

DIAMOND

Stealth II is a gamer's card and the latest inexpensive consumer 3D accelerator from Diamond Multimedia. At \$269, the Stealth II S220 was the second cheapest of the cards we tested. Our tests showed that it's a relatively fast 3D accelerator card for the money. Its fourth-place score of 333 in the 3D WinBench 98 3D WinMark gained the Stealth respectability as a powerful DirectX accelerator card.

Stealth's Rendition Vérité V2100 processor produced 26.3 frames per second in the Quake II OpenGL environment. Its 2D performance was average when compared to the field. A below-average score in the Winstone 98 Business Winstone and WinBench 98 Business Graphics WinMark was made worse by the card's last placing in the WinBench 98 High-End Graphics WinMark. The card has not been optimised for such applications.

The card comes with 4M of SGRAM, and can offer resolutions of up to 1,600 by 1,200, with 65,000 colours and a refresh rate of 86Hz. Diamond does not offer an AGP version of the card.

- **Distributor** Chips and Bits
- **Phone** (02) 9696 1911
- **Online** <http://www.diamondmm.com>
- **Price** \$269
- **In short** A good budget-buyer's card.

Viper V330

DIAMOND

Viper is Diamond's high-performance consumer card, based on the Riva 128 multimedia processor. With excellent performance in both the 2D and 3D benchmark tests, this card has earned our Editor's Choice award.

In the configuration APC received, Viper used 4M of SGRAM and a 230MHz RAMDAC; memory expansion was not included on the board. Available in both PCI and AGP versions, the Viper comes with 11 software titles including Moto Racer, F-22 Raptor, Web 3D and PhotoSuite SE. Not only does the Viper perform well, it also incorporates video-in and TV-out connectors for video capture and TV playback applications. The interface supports composite and S-video formats.

The Viper was the best overall-performing card, scoring second place in the WinBench 98 Business Graphics WinMark and Business Winstone tests, and third place in the High-End Graphics WinMark. The combination of the Viper's Riva processor and some finely tuned drivers gave the Viper the fastest 3D WinBench 98 3D WinMark performance of 436 WinMarks. Its Quake II performance was also above average, with a frame rate of 32.3.

The Viper's \$449 price tag places it in the upper echelons of affordability, but its excellent performance marks it as an exceptional card worthy of a slot in any PC.

- **Distributor** Chips and Bits
- **Phone** (02) 9696 1911
- **Online** <http://www.diamondmm.com>
- **Price** \$449
- **In short** Overall, Viper 330 was the fastest card in our review.

CoolView 3D

DOOIN

The CoolView 3D from Doooin Electronics was the cheapest of the cards based on the Riva 128 chip.

For the price, you get a card powered by one of the most powerful desktop 3D processors on the market, running on a 230MHz RAMDAC and packing 4M of SGRAM. This configuration can support a maximum resolution of 1,600 by 1,200 pixels at a colour depth of 65,000 colours and a refresh rate of 75Hz. The CoolView does not have any of the video/display bells and whistles of the more expensive

Riva-based Canopus and Viper cards. Instead, it is a graphics card that offers the best price/performance ratio for 3D Windows applications.

The Riva-based cards occupied the top three positions in the 3D WinBench 98 3D WinMark test; the CoolView tied for second place with the Canopus Total3D. In the Quake II test, the CoolView placed second, producing 37.3 frames per second when running at a resolution of 640 by 480. In the 2D tests, it scored slightly above average in all tests.

There is a connector on the board that will allow for a hardware MPEG upgrade. The CoolView comes with only two applications: WinCine, a video/audio CD player, and CV3D, a display control program.

If you need the best 3D performance on a budget, then the CoolView 3D is the card to take home.

- **Distributor** Samsung
- **Phone** (02) 9955 3888
- **Online** <http://www.doooin.com>
- **Price** \$348
- **In short** Very good 3D performance on a budget.

WinFast 3D L2300

LEADTEK

Built as a general-purpose card, the Leadtek was the cheapest of the 8M cards in this review. The card runs on a 3Dlabs Permedia II processor, uses a 230MHz RAMDAC and holds 8M of SGRAM onboard to hold textures. In this 8M configuration, the WinFast 3D can display at resolutions of up to 1,600 by 1,200 and show 65,000 colours.

The performance of the Leadtek WinFast L2300 was somewhat disappointing. Under the 2D tests, it lagged at the lower end of the scale. Its 3D WinBench 98 3D WinMark result of 277 was below the average of the group; in our Quake II OpenGL test, it managed 26.9 frames per second.

There is an AGP version of the WinFast available. Drivers for the product include an installable client driver for OpenGL under Windows 95 and Windows NT, as well as DirectX drivers and Autodesk Heidi acceleration.

Leadtek has bundled a mix of software titles including 3D F/X and Digital Video Producer from Asymetrix, RealMation STE from Datapath, IE4 and VDOLive.

- **Distributor** Tech-Excel Distribution
- **Phone** (02) 9417 7898



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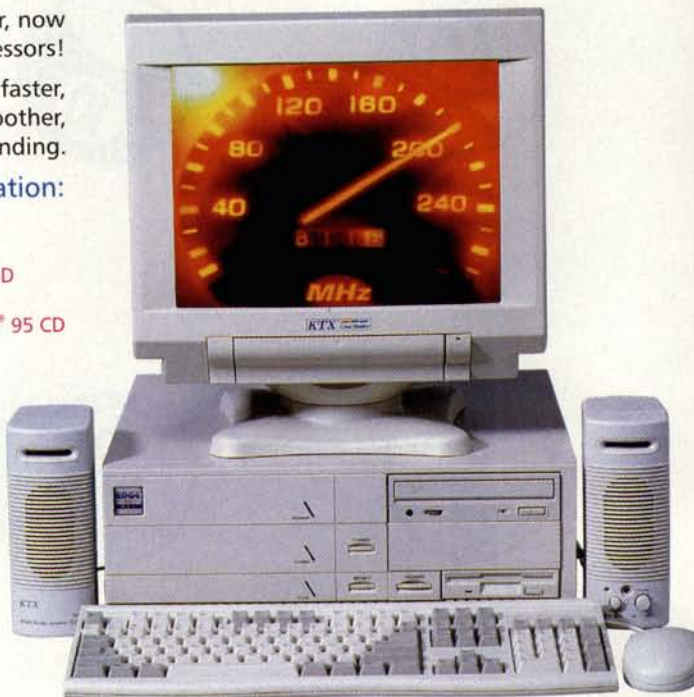
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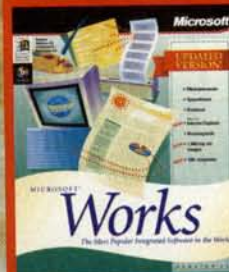
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* Test Configuration*: Mtech R534G Motherboard, 512k pipeline burst cache, 32Mb EDO memory, Matrox Millennium w/4Mb, Adaptec AHA2940 SCSI-3 host bus adapter, Barracuda SCSI Drive. * All results set forth above were obtained through benchmarking performed by XXCAL, Inc. Testing Laboratories, an independent laboratory not affiliated with IBM. * EDGE MX200 components may differ. * 6x86 and the 6x86MX logo are trademarks of Cyrix Corp. * MMX and Pentium are trademarks of Intel Corp. * AMD-K6 is a trademark of Advanced Micro Devices, Inc. * Microsoft and Windows are registered trademarks and the Genuine Microsoft Products logo is a trademark of Microsoft Corporation in the United States of America and in other countries. Box shots are reprinted with permission from Microsoft Corporation. Retail box photographs are used for illustration only - OEM product is supplied (in plain packing).

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- **Online** <http://www.leadtek.com>
- **Price** \$350
- **In short** The cheapest 8M card in the review, but its overall performance was below average.

Revolution 3D

NUMBER NINE

Number Nine uses its own Ticket to Ride processor in this 8M 3D accelerator card. One of the best things about the card is the HawkEye utilities that come with all of Number Nine's graphics products. The HawkEye utilities provide advanced functionality such as hardware zoom, screen or colour adjustment and hotkeys.

This was the most expensive card in our review. It uses 8M of WRAM but there is a less expensive 4M version available. Number Nine has skimped slightly on the bundled titles, only supplying the HawkEye drivers, Star Trek MPEG screen saver and Internet Explorer. For the \$845 price tag, more software would have been welcome.

The Revolution 3D came out as the fastest 2D card in the group; however, its 3D performance was lacklustre. The 3D WinBench 98 3D WinMark score was way below average, ahead of only the two Videologic cards.

The Revolution 3D was unable to perform the Quake II test because there was no OpenGL drivers available for the card at the time of testing.

- **Distributor** Focal Point Computing
- **Phone** (03) 9525 1144
- **Online** <http://www.nine.com>
- **Price** \$845
- **In short** The fastest 2D accelerator card of the lot, but let down by weak 3D performance and a hefty price tag.

Apocalypse 5D

VIDEOLOGIC

While all of the other game accelerators are optimised for the DirectX standard, the \$645 Videologic Apocalypse 5D card has taken a path less travelled.

Using the NEC PowerVR PCX2 chip, the Apocalypse 5D could not perform the 3D WinBench 98 3D WinMark test. This was because the card's DirectX drivers do not fully support all of the 3D test functions and forced the test to use software emulation, which defeats the purpose of having a Direct3D accelerator. The PowerVR technology performs best with games and

applications specially written using the PowerSGL APIs for the processor. In our Quake II test, the Apocalypse 5D pulled in a third-place result of 34.5 frames per second.

On the card itself is 4M of SDRAM for storing textures and 4M of MBDRAM for standard graphic functions. The Apocalypse 5D uses a relatively slow 175MHz RAMDAC.

A definite highlight of the Apocalypse is the quality of the games titles included in the box: Mech Warrior 2, Ultim@te Race, Wipeout XL, Tomb Raider and Terracide are included. Best of all, they are all optimised for the PowerVR processor.

While technically very powerful, the lack of support for common standards and the less-than-amazing 2D performance do not rank this card highly against alternatives that offer better value.

- **Distributor** Videologic Upgrade Centre
- **Phone** 1800 067 722
- **Online** <http://www.videologic.com>
- **Price** \$645
- **In short** Impressive performance using the PowerVR proprietary standard, yet unimpressive under 2D and DirectX.

GrafixStar 560

VIDEOLOGIC

The GrafixStar 560, a 4M graphics accelerator, was the only card in this review to implement the now slightly dated Cirrus Logic Laguna multimedia graphics processor.

This was the cheapest card in our review. It supports a maximum resolution of 1,600 by 1,200 and uses a 230MHz of RAMDAC. Unfortunately, this configuration did not translate into impressive performance. It was the slowest card in our application-based Winstone 98 Business Winstone test and ran second last in the Business Graphics WinMark and High-End Graphics WinMark. It also ran second last in the 3D WinBench tests, and as there were no OpenGL mini-port drivers available for the card, we were unable to run the Quake II test.

- **Distributor** Videologic Upgrade Centre
- **Phone** 1800 067 722
- **Online** <http://www.videologic.com>
- **Price** \$235
- **In short** The cheapest card in the review, but also the least impressive performer.



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Specifications: Graphics cards

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Phone	(03) 9761 4299/(02) 9870 1999	(03) 9761 4299/(02) 9870 1999	(02) 9906 8887	(02) 9906 8887	(03) 9696 1911	(03) 9696 1911
Online	http://www.atitech.com	http://www.atitech.com	http://www.canopuscorp.com	http://www.creaf.com	http://www.diamondmm.com	http://www.diamondmm.com
Price	\$450/\$399	\$399/\$349	\$449	\$299	\$549	\$269
Graphics processor	ATI 3D Rage Pro	ATI 3D Rage Pro	nVidia Riva 128	3Dlabs Permedia 2	3Dlabs Permedia 2	Rendition Vérité V2100
Display memory and type	4M SGRAM	4M SGRAM	4M SGRAM	4M SGRAM	8M SGRAM	4M SGRAM
Maximum memory	8M	8M	4M	8M	8M	4M
Maximum resolution/colour depth/refresh rate	1,600 by 1,200/65K/85Hz	1,600 by 1,200/65K/85Hz	1,600 by 1,200/65K/85Hz	1,600 by 1,200/65K/85Hz	1,920 by 1,080/65K/75Hz	1,600 by 1,200/65K/85Hz
AGP version available	Yes	Yes	No	No	Yes	No
RAMDAC speed	230MHz	230MHz	230MHz	230MHz	230MHz	170MHz
Platforms supported	DOS, Windows 3.1, Windows 95, Windows NT, OS/2	DOS, Windows 3.1, Windows 95, Windows NT, OS/2	DOS, Windows 95, Windows NT	DOS, Windows 95, Windows NT	DOS, Windows 95, Windows NT	DOS, Windows 3.1, Windows 95, Windows NT
APIs supported	DirectX, OpenGL, Heidi	DirectX, OpenGL, Heidi	DirectX	DirectX, OpenGL, Heidi	DirectX, Open GL, Heidi, Direct3D	DirectX, OpenGL, Direct3D
Warranty	5 years	5 years	3 years	1 year	3 years	3 years
3D features						
DirectX version	5.0	5.0	5.0	5.0	5.0	5.0
Graphic driver name and version	MACXW4.DRV 4.10.01.2227	MACXW4.DRV 4.10.01.2227	T3VDISP.DRV 4.10.01.206	EXXTREME.DRV 4.03.00.2104	GLINT.DRV 4.10.01.2248	V2KSIIXL.DRV 4.10.01.101
Flat shading/Gouraud shading	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Dithering	Capable	Capable	Capable	Capable	Capable	Capable
Z-buffer	Capable	Capable	Capable	Capable	Capable	Capable
Perspective correction	Capable	Capable	Capable	Capable	Capable	Capable
Nearest	Capable	Capable	Capable	Capable	Capable	Capable
Linear	Capable	Capable	Capable	Capable	Capable	Capable
Nearest mipmap nearest	Capable	Capable	Capable	Capable	Incorrect	Capable
Nearest mipmap linear	Capable	Capable	Capable	Capable	Incorrect	Capable
Linear mipmap nearest	Capable	Incorrect	Not capable	Incorrect	Incorrect	Capable
Linear mipmap linear	Capable	Capable	Not capable	Incorrect	Incorrect	Incorrect
Modulate texture blending	Capable	Capable	Capable	Capable	Capable	Capable
Decal texture blending	Incorrect	Incorrect	Capable	Capable	Capable	Capable
DecalAlpha texture blending	Capable	Capable	Incorrect	Capable	Capable	Capable
ModulateAlpha texture blending	Not capable	Not capable	Capable	Capable	Capable	Capable
Flat wrap texture addressing	Capable	Capable	Capable	Capable	Capable	Capable
Cylindrical wrap u	Capable	Capable	Capable	Capable	Capable	Capable
Cylindrical wrap v	Capable	Capable	Capable	Capable	Capable	Capable
Clamp texture addressing	Capable	Capable	Capable	Incorrect	Capable	Capable
Mirror texture addressing	Not capable	Not capable	Capable	Capable	Capable	Not capable
Cull counterclockwise	Capable	Capable	Capable	Capable	Capable	Capable
Cull clockwise/Cull none	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Fog vertex linear/Fog table linear	Capable/Not capable	Capable/Not capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Fog table exponential	Not capable	Not capable	Incorrect	Not capable	Not capable	Not capable
Specular highlights	Capable	Capable	Capable	Capable	Capable	Capable
Colour key transparency	Capable	Capable	Capable	Capable	Capable	Capable
Alpha transparency	Capable	Capable	Capable	Capable	Capable	Capable
Source alpha pixel blending	Capable	Capable	Capable	Capable	Capable	Capable
Add pixel blending	Capable	Capable	Capable	Incorrect	Capable	Capable
Modulate pixel blending	Capable	Capable	Capable	Not capable	Capable	Capable
Alpha vertices	Capable	Capable	Capable	Not capable	Not capable	Capable
Fog vertex and colour key	Capable	Capable	Incorrect	Capable	Capable	Capable
Fog vertex and alpha	Incorrect	Incorrect	Incorrect	Capable	Capable	Capable
Anti-aliasing	Not capable	Not capable	Not capable	Not capable	Not capable	Not capable
Texture swapping	Capable	Capable	Capable	Capable	Capable	Capable
Narrow z accuracy	Incorrect	Incorrect	Incorrect	Incorrect	Incorrect	Incorrect
Wide z accuracy	Incorrect	Incorrect	Incorrect	Incorrect	Incorrect	Incorrect
High triangle count	Capable	Capable	Capable	Capable	Capable	Capable
Texture fidelity	Capable	Capable	Capable	Capable	Capable	Capable
Winstone 98 Business Winstone	20.7	20.4	20.1	19.8	20.8	20
WinBench 98 Business Graphics WinMark	120	118	106	121	123	97.8
WinBench 98 High-end Graphics WinMark	112	136	122	137	140	95
3D WinBench 98 3D WinMark	254	252	417	250	260	333
Quake II Windows 95 OpenGL test	N/A**	N/A**	41.5	22.2	22.6	26.3

NOTES

1. 'Incorrect' means that while a card's drivers claimed to support a certain feature, under our testing conditions the card was found to perform this feature incorrectly.
2. All products used in these tests are shipping versions available to the public at time of publication.
3. Winstone, WinBench and associated programs are registered trademarks of the Ziff-Davis Publishing Company.
4. These tests were performed without independent verification by Ziff-Davis, and Ziff-Davis makes no representations or warranties as to the results of the tests.
5. N/A* The Apocalypse 5D uses software emulation under the Direct3D tests.
6. N/A** These cards did not have OpenGL drivers available for Windows 95 at the time of testing.

Specifications: Graphics cards

Product	Diamond Viper V330	DooIn CoolView 3D	Leadtek WinFast L2300	Number Nine Revolution 3D	Videologic Apocalypse 5D	Videologic GrafixStar 560
Distributor	Chips and Bits	Samsung	Tech-Excel Distribution	Focal Point Computing	Videologic Upgrade Centre	Videologic Upgrade Centre
Phone	(03) 9696 1911	(02) 9955 3888	(02) 9417 7898	(03) 9525 1144	1800 067 722	1800 067 722
Online	http://www.diamondmm.com	http://www.dooIn.com	http://www.leadtek.com	http://www.nine.com	http://www.videologic.com	http://www.videologic.com
Price	\$449	\$348	\$350	\$845	\$645	\$235
Graphics processor	nVidia Riva 128	nVidia Riva 128	3Dlabs Permedia 2	Number Nine Ticket to Ride	NEC PowerVR PCX2, Tseng Labs ET6100	Cirrus Logic Laguna GD 5465
Display memory and type	4M SGRAM	4M SGRAM	8M SGRAM	8M WRAM	4M SGRAM, 4M MBD RAM	4M RDRAM
Maximum memory	4M	4M	8M	12M	8M	4M
Maximum resolution/colour depth/refresh rate	1,600 by 1,280/65K/85Hz	1,600 by 1,200/65K/75Hz	1,600 by 1,200/65K/60Hz	1,920 by 1,060/65K/73Hz	1,600 by 1,200/65K/48Hz	1,600 by 1,200/256K/85K
AGP version available	Yes	Yes	Yes	Yes	No	Yes
RAMDAC speed	230MHz	230MHz	230MHz	220MHz	175MHz	230MHz
Platforms supported	Windows 95, Windows NT	Windows 3.1, Windows 95, Windows NT, OS/2	Windows 95, Windows NT	DOS, Windows 3.1, Windows 95, Windows NT	DOS, Windows 95, OS/2	Windows 3.1, Windows 95, Windows NT, OS/2
APIs supported	DirectX, OpenGL, Internet VRML	DirectX, OpenGL	Open GL, Heidi, Direct3D	DirectX	DirectX, OpenGL, Power SGL	DirectX
Warranty	3 years	1 year	1 year	5 years	5 years	5 years
3D features						
DirectX version	5.0	5.0	5.0	5.0	5.0	5.0
Graphic driver name and version	NV3LE.DRV 4.10.01.14	NV3DISP.DRV 4.10.01.206	GLINT.DRV 4.03.00.2102	REV3DP.DRV 1.04.00.9335	VLGX600A.DRV 4.00.00.3803	VLGX560A.DRV 4.10.00.03
Flat shading/Gouraud shading	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Dithering	Capable	Capable	Capable	Capable	Capable	Capable
Z-buffer	Capable	Capable	Capable	Capable	Capable	Capable
Perspective correction	Capable	Capable	Capable	Capable	Incorrect	Capable
Nearest	Capable	Capable	Capable	Capable	Capable	Capable
Linear	Capable	Capable	Capable	Capable	Capable	Capable
Nearest mipmap nearest	Capable	Capable	Capable	Capable	Capable	Capable
Nearest mipmap linear	Capable	Capable	Capable	Capable	Capable	Capable
Linear mipmap nearest	Not capable	Not capable	Incorrect	Incorrect	Capable	Incorrect
Linear mipmap linear	Not capable	Not capable	Incorrect	Incorrect	Not capable	Incorrect
Modulate texture blending	Capable	Capable	Capable	Capable	Capable	Capable
Decal texture blending	Capable	Capable	Capable	Capable	Not capable	Capable
DecalAlpha texture blending	Incorrect	Incorrect	Capable	Incorrect	Not capable	Not capable
ModulateAlpha texture blending	Capable	Capable	Capable	Incorrect	Not capable	Not capable
Flat wrap texture addressing	Capable	Capable	Capable	Capable	Capable	Capable
Cylindrical wrap u	Capable	Capable	Capable	Capable	Capable	Capable
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Clamp texture addressing	Capable	Capable	Capable	Incorrect	Not capable	Capable
Mirror texture addressing	Capable	Capable	Capable	Not capable	Not capable	Not capable
Cull counterclockwise	Capable	Capable	Capable	Capable	Capable	Capable
Cull clockwise/Cull none	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable	Capable/Capable
Fog vertex linear/Fog table linear	Capable/Capable	Capable/Capable	Capable/Not capable	Capable/Not capable	Capable/Capable	Capable/Not capable
Fog table exponential	Incorrect	Incorrect	Not capable	Not capable	Capable	Not capable
Specular highlights	Capable	Capable	Capable	Capable	Capable	Capable
Colour key transparency	Capable	Capable	Capable	Capable	Capable	Capable
Alpha transparency	Capable	Capable	Capable	Capable	Not capable	Capable
Source alpha pixel blending	Capable	Capable	Capable	Incorrect	Not capable	Capable
Add pixel blending	Capable	Capable	Incorrect	Capable	Not capable	Capable
Modulate pixel blending	Capable	Capable	Not capable	Incorrect	Not capable	Not capable
Alpha vertices	Capable	Capable	Not capable	Incorrect	Not capable	Capable
Fog vertex and colour key	Capable	Capable	Capable	Capable	Capable	Capable
Fog vertex and alpha	Incorrect	Incorrect	Incorrect	Capable	Not capable	Incorrect
Anti-aliasing	Not capable	Not capable	Not capable	Not capable	Not capable	Not capable
Texture swapping	Capable	Capable	Capable	Capable	Capable	Capable
Narrow z accuracy	Incorrect	Incorrect	Incorrect	Incorrect	Incorrect	Incorrect
Wide z accuracy	Incorrect	Incorrect	Incorrect	Capable	Incorrect	Incorrect
High triangle count	Capable	Capable	Capable	Capable	Capable	Capable
Texture fidelity	Capable	Capable	Capable	Capable	Incorrect	Incorrect
Winstone 98 Business Winstone	21	20.3	19.9	21.1	19.4	18.5
WinBench 98 Business Graphics WinMark	125	106	95.7	141	75.9	84.2
WinBench 98 High-end Graphics WinMark	140	124	106	156	96	95.8
3D WinBench 98 3D WinMark	436	417	277	163	N/A*	160
Quake II Windows 95 OpenGL test	32.3	37.3	26.9	N/A**	34.5	N/A**

NOTES

1. 'Incorrect' means that while a card's drivers claimed to support a certain feature, under our testing conditions the card was found to perform this feature incorrectly.
2. All products used in these tests are shipping versions available to the public at the time of publication.
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5. N/A* The Apocalypse 5D uses software emulation under the Direct3D tests.
6. N/A** These cards did not have OpenGL drivers available for Windows 95 at the time of testing.

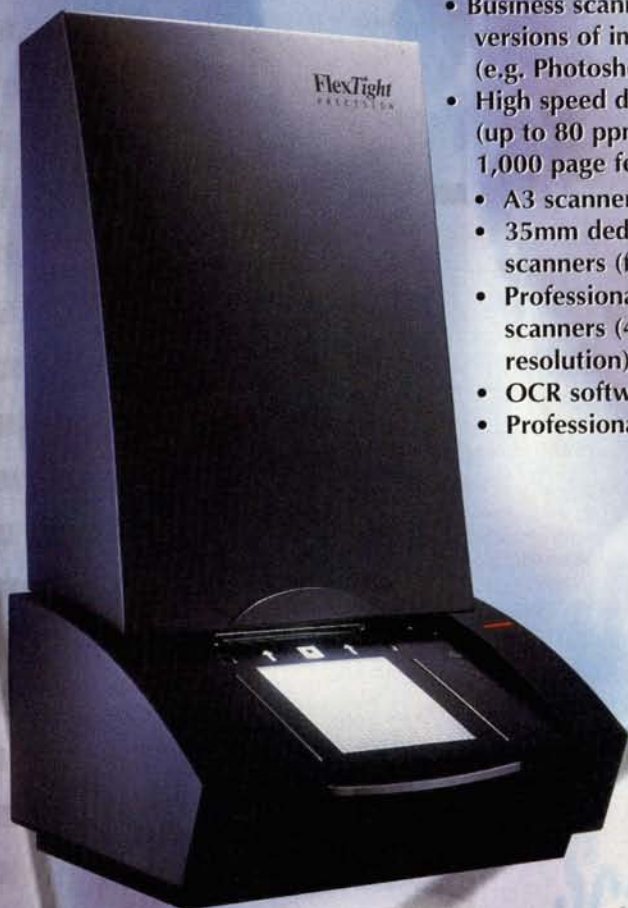
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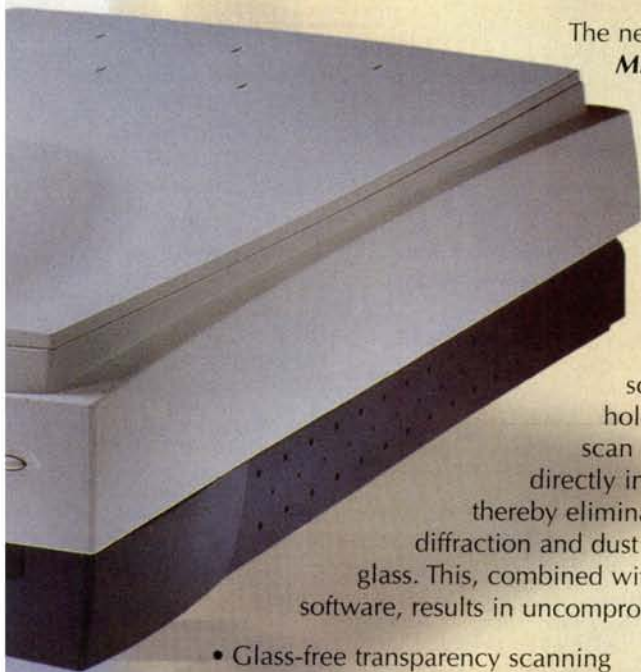
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First there was BBS, then came IRC. The next wave of desktop communication will be via conferencing software. By Jeremy Torr

Collaboration and conferencing software

The jump of the Internet onto the corporate desktop (and the home cubbytop too) has been heralded as the ultimate linking activity. Email, Web browsing, and data collection from a world away is all possible. However, the real advantage of the Net is to a large extent still untapped. It offers the ability to work simultaneously on a set of documents, ideas and images with anyone, anywhere, at a time convenient to them all. At the moment, the available options are relatively limited. But the new breed of collaborative or conferencing software could offer the single biggest leap forward in computing since the Net escaped from the command-line into images.

To date, the potential for users from different geographic locations to exchange data, files and opinions has been fairly poorly served. Although there have always been a host of disparate applications offering file transfer, whiteboard sharing, video exchange and voice mail, the use and integration of these has always been less than simple. And the few industrial-strength apps that have combined all these aspects have required some fairly hefty processing and transmission capabilities. ISDN lines, dedicated workstations and expensive video cameras have been the norm, instead of dial-up modems, local service ISPs and run-of-the-mill video and soundcard equipment.

But now the scene is changing. The marketers have seen the growth of the Internet and intranets as a strong signal that conferencing could well be the purple bubble of the late 1990s. Almost all the major software houses have produced or are working on product with a strong groupware focus. All that is needed now is the monitoring and connectivity software to glue all these chat-capable packages together and keep them behaving properly in the Net-queue. As yet, few standards are emerging in this area apart from VIM, H.323, ITU T.120 and LDAP ILs (lightweight directory access protocol

Internet locators). But this hasn't stopped the two big players in the market from coming up with workable solutions right now. The two products which have recently made the leap from vapourware into reality are NetMeeting from Microsoft and Conference from Netscape. Both come as part of the latest browser versions, both are quite capable products and, more importantly, neither demand any special hardware above the normal modem and ISP or LAN connection available on most PCs, plus the normal operating system requirements.

And although neither of the above-mentioned products are what might be described as the ultimate solution, they both offer the kind of major step forward that Web browsers offered when Mosaic was first released into the public domain. They represent a solid platform for development and improvement, one that can only improve and gain popular support given the power and connectivity potential offered by today's desktop machines. The big appeal of this kind of package is that they offer both the localised and the virtual corporation the ability to correspond not just textually, but also graphically, audi-

bly and even visually if the right hardware is fitted to the connected parties.

There are still some question marks regarding open standards, security and cross-platform viability, but overall these products raise a strong signal flag that conferencing is available now, and that it is workable and inexpensive. The ability to exchange details in real time over the Net is with us now, and can be implemented on almost any old modem-equipped stand-alone machine or over any standard LAN.

Who wants it?

Most users see the advent of conferencing software in two ways. First there's the 'wow' aspect, which makes it appealing simply because it enables communication in ways not previously possible. This will be the biggest influence on the geek brigade who have allowed Net phones to gain a noticeable foothold in the comms market. This group helps such technologies take hold not because they are better solutions, but because they love tinkering and living in the hope that something better will eventuate, and they will then be able to reminisce about the pioneering



days. The other main way to view conferencing software is from the useful capability aspect. This is much harder to define, but most observers agree that the future of conferencing nonetheless augurs well on a practical level. The ability to share files in real time, to exchange chat messages and immediate email while watching (albeit slow) video of the person on the other end of the line is appealing in a way which goes well beyond the packet-based file exchange systems of the past. Business advantage can obviously be gained without the time overheads in terms of non-interactive email group work. The removal of face-to-face conferences adds a price advantage too — as long as the operating costs are not too high.

However, users need to remember the ability of these conferencing apps depends as much on the ability of the hardware to offer fast connections as it does on the software itself. As such, the initial video exchange between NetMeeting clients is what some have described as 'granny-phone' quality. That is, it offers under 10 frames per second in a fairly small window. Additionally, the capacity to offer unlimited seats at any particular conference is still a twinkle in the developers' eyes. NetMeeting contends it can offer this, and Conference doesn't even try, but in reality neither has created the full-on, round-the-virtual-table scenario.

In fact, the majority of users will probably never use the full capability of this kind of software, but are more likely to dabble in a few areas until they become familiar with it. But in the same way email has become indispensable, it is likely that the cost and availability of conferencing and collaboration software will bring it into the mainstream application bracket. As such, the likelihood is that many small and medium businesses will migrate to this form of group communication. However, in some ways it will suffer from chicken-and-egg syndrome. Until the number of users with the software loaded and configured reaches critical mass, there will not be the incentive for users to get up and running. There are, of course, standards such as the H.323 cross-package audio and video data conversion standard, but the new battle of the conferencing software could see yet more blood spilt between Microsoft and Netscape.

Indicators

The decision to move some of your work practices towards conferencing software should hinge on whether you can imple-

ment a successful (read, workable) solution. In any instance, this will revolve around the simplicity of the software and its transparency to users. If complex and frightening log-on, exchange and connection procedures are required, then many users are simply likely to ignore the facility. This does carry a parallel penalty, however. With simplicity and convenience comes a security risk, especially on the Web.

The basic functionality of conferencing software should include some kind of mobile clipboard or whiteboard, the ability to share documents using the same software at both ends, an audio or keyboard-driven chat session capability, plus an independent file transfer capability. It pays to check whether the system uses a standard application suite on all conferenced machines, because some require the same software at each client to enable document exchange. Although audio and video sound very attractive in the conferencing context, the reality is that the overheads can really drag the overall efficiency down, and the quality will be barely acceptable. In reality — especially if dial-up connections are likely — the core document and file exchange capacities are the real reasons to try conferencing. The 'wow' aspect of sound and vision could be a red herring at this stage of product development.

The other vitally important issue for many organisations looking at the conferencing solution is cross-platform capability. At present this is not particularly well served, but in view of the level of functionality currently available there is a fair chance the desktop in question will be running Windows, Mac or Unix — and most of these are served adequately. This situation is likely to change fairly rapidly in the near future as the software becomes more popular. With cross-platform capability comes multiuser capacity. Although most people think of several users corresponding at once, the reality is that as soon as any serious number start to work together on the same session, the speed of data exchange drops dramatically, especially if some users are using dial-up ISP links. And in some cases the 'conference' is restricted to only a pair of correspondents.

But with the ready availability of workable conferencing products, it could be worth giving it a pilot implementation. The costs are minimal and for many organisations it offers a significant opportunity to make existing equipment more useful without any extra investment other than the software itself. ■

NetMeeting

MICROSOFT

NetMeeting comes as part of IE, but has the advantage that although it integrates smoothly into the browser it can be loaded and run as a standalone application in its own right. As a standalone, it uses just over 3M of space, which is very compact. This is a real plus for users of other systems — as long as they are running Windows 95 or NT. The fly in NetMeeting's ointment at present is the lack of Windows 3.1, Mac or Unix versions. A minimum of a 486 66MHz system with 8M RAM is required to run the software, but to use video, a minimum system of a Pentium 90 with 16M RAM is recommended. However, as stated in the introduction to these reviews, this is no reason to be put off as the reality of conferencing video is slim in most instances. The program includes the main functions of audio, whiteboard, application sharing, text chat and file transfer. These are accessed from a very icon-based toolbar, in much the same vein as IE, so Microsoft aficionados should have no major interface problems.

NetMeeting is probably the easier of the two products to set up, and uses a familiar wizard to guide the user through the various stages. After filling in personal details and server of choice, the user will have to reboot if using IE4, but if the standalone version is being used it can be run straight from the install. Users can either connect directly to one other user, or connect in conference via one of the Microsoft IL servers. Logging onto one of these may take some time and it is often better to choose other than the default logon. Additionally, use of any of these servers is open to all, so security could be an issue, especially in view of the rather questionable nature of some conferences that are often being conducted. Criticisms aside, the system does work. For revheads, the Intel Connection Advisor shows the data rate of audio/video exchange as well as CPU usage.

NetMeeting has direct integration with Outlook using an Outlook Bar and folder list on the left-hand side of the user interface. This allows contacts and time events to be easily accessed while using NetMeeting, and avoids having to use a separate address list for contacts. There is support for multiple video devices, so users can choose from a range of video capture devices, and the software includes built-in support for both ITU H.323 and T.120 standards.

Microsoft claims a 14.4Kbps modem is

enough for a simultaneous chat session, whiteboard and file transfer, but says that 28.8Kbps and higher is required for audio/video. In reality, even 28.8Kbps is pretty weak when using video, but voice is reasonably acceptable, presumably thanks to the compression used. Both



audio and video are only available on a two-person basis, even in the midst of a conference with more users. Support is also offered for ISDN and LAN connections, so if you really want the singing and dancing, this is probably the best way to go. Speed is quite fast locally over a direct connect LAN. Features like whiteboard, application sharing and chat also have good response times without undue lag, even over a dial-up connection. If the user is connecting on a LAN, the connection can use the TCP/IP or NetBIOS protocol. But despite claims on the supplied documentation, we had great difficulty using email when trying to connect with the TCP/IP protocol. Using an IL server is simply a matter of choosing the directory, logging in the other users' addresses and establishing the link.

Security-wise, NetMeeting correspondents can be granted access by existing

participants, or links can be filtered using the included menu option. You can also opt to hide your own address if you don't want unwanted callers. But users with heavy firewall systems may well find that NetMeeting baulks, especially if incorporating video, as direct TCP/IP logs need to be established. This may well cause concern in some quarters, and Microsoft does admit that there is no encryption method included. The other security features are Whisper mode, where one person can talk directly to another without public scrutiny, and View Only mode for whiteboard use. This allows inspection but not collaboration, and incidentally also speeds up data exchange considerably, which is a useful option.

For users wishing to repeat connections on a frequent basis, all names and details of those who joined in a conference are retained. If they have been logged into a server, you may repeat that session with a few mouse-clicks — assuming the others are also logged on, of course. The same applies if contact was via TCP/IP. The program also offers a History icon which shows all contacts your machine has previously been involved with.

In terms of application and document sharing, NetMeeting enables users in a meeting to interact with various applications, such as calendar, even if they don't have the program on their own machine. This is a real plus, and added to the whiteboard's good speed and useful tools, it makes this area alone worth considering as a business app. Getting help is a matter of looking at the MS Web page tutorials, where updates can also be located. There are no manuals.

NetMeeting is reasonably fast and has

a very good spread of functionality. Security and non W95/NT users may have quibbles, but overall it is a very competent accessory to any browser.

- **Distributor** Microsoft
- **Phone** (02) 9870 2200
- **Online** <http://www.microsoft.com.au>
- **Price** Included in IE or available separately as a free download
- **In short** A good introduction to the world of conferencing.

Conference

NETSCAPE

Supplied as part of its browser suite, Conference is Netscape's offering in the collaboration field, although its name is confused by the sister app Collabra (also bundled in Communicator), which offers newsreader capabilities. It is easy to set up, and leads the user gently through testing the audio capabilities and logging onto the four11.com server. This is very easy, partly because Conference doesn't have the zing that NetMeeting does. It is simpler, but also cuts corners on functions such as audio, video and document sharing.

The subsections, all of which operate in their own little window when activated, include whiteboard, chat, audio, semi-voice mail and file exchange. The system demands are about the same as those for NetMeeting, but as it comes as part of the overall Communicator package, expect it to need 10M to 16M of disk space, depending on how many components are installed.

Box requirements are the same as Communicator — at least a 486, a 68030 or PowerPC (Mac) or a Unix machine with 16M of RAM. Netscape says the package includes support for H.323 and RTP, which is not quite as open as Microsoft's product,

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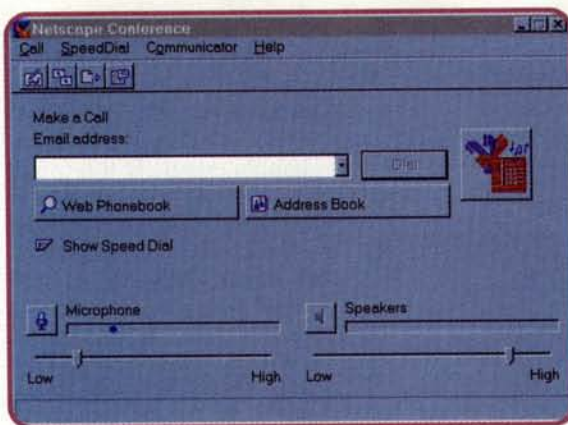
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but is definitely heading in the right direction. The current version does not have T.120 support, which definitely excludes it from the ranks of open exchange of documents and files. Hopefully this will be remedied in future releases.

When first running Conference, you are required to fill in details about yourself, the type and speed of your connection, and so on. Once this is done, your name is registered at the four11.com server with an option to have your name listed or unlisted in its phone book. To contact someone, all you have to do is call them on their email address or direct IP address. Netscape provides a DLS server which acts as an email-to-IP address translator, allowing users to communicate with each other via email addresses rather than having to remember or determine IP addresses. This is very useful, and reduces the need for endless lists of mail, conference, IP and other addresses to be kept on file.

Provided the person you are contacting has Conference open, they can



either accept or decline contact with you. Unfortunately, Conference only supports point-to-point connections, so bringing a host of others in on your work is not possible. This is a definite negative, as conferencing is normally a work-group activity, not just one-to-one. The voice aspect is good, and has the extra feature of a sort of 'ring' tone for distant users. This automatically attaches audio

to a voice mail which is then sent to the other person, asking them to load Conference to start a session. Unfortunately, in terms of 'ticks on the board', Conference does not support any video exchange at all, which definitely puts it on the back foot compared to NetMeeting, even if you are unlikely to ever use it.

In terms of interface, Conference is less cluttered than NetMeeting, with each window working as a standalone.

It also comes in more flavours than NetMeeting, with Windows 3.1, 95, NT, OS/2, SCO and Power Mac, as well as eight other Unix versions available — much better for many corporate users. However, if this is appealing, the lack of application sharing definitely isn't. The whiteboard can be used to take clips and annotate, and files can be exchanged, but nothing like data or application

Video connection

All singing, all dancing

Although the majority of serious conferencing work involves the exchange of data and whiteboard comments, there is no doubt the addition of audio and video adds considerably to the appeal, if not the utility, of conferencing software. Both NetMeeting and Conference offer audio links, and NetMeeting also throws in video links if the connection will support it via suitable hardware.

NetMeeting

NetMeeting automatically sets up the audio levels when it first runs the program. When the connection is established via an ILS server, participants have the opportunity to establish a conversation parallel to the hard data exchange. Our test enabled us to initiate a conversation between three people, from the US, Canada and India.

The sound quality overall was very good, but increasing the number of participants introduced both quality and time-allocation issues. Interference was not a problem and the digital codecs cut out most of the hiss and crackle. When the soundcard was set in full-duplex mode, there was a slight loss in information when more than one party was speaking at once.

Audio seemed to have little noticeable effect on chat and whiteboard speeds, although there may have been a slight dip in application sharing speeds.

The video facility is available even with a 28.8Kbps dial-up link, but again, the quality drops in proportion to the number of users connected and the degree of transmission that is happening. The actual video images are full colour, but quality depends on the sender's connection.

Conference

Like NetMeeting, Conference sets up an audio connection when you call someone successfully. It uses Netscape's own audio compression codecs to cope with varying link speeds, but despite this, when connected at speeds of 28.8Kbps, the sound was not of particularly high quality. One of the connected parties could usually hear reasonably well, while the other had difficulty making sense of what was being said. The reason for this one-way quality was hard to determine, and may be dependent on the connection or modem being used. The transmission could be changed to make the connection half-

duplex in effect, which can improve the quality slightly.

There are also three levels of audio compression supported which can be changed to suit the speed of connection to get the best possible results. At full-duplex, simultaneous chat from both sides did cause a noticeable reduction in quality of audio. Overall sound quality could be improved slightly using the microphone controls provided.

No provision for video links is provided in Conference, so this could not be tested. At this stage in the development of desktop conferencing software, we suspect that in most cases the advantages of having audio and video links are likely to be overshadowed by their limitations. Frustration with longer waits and slower data transmit speeds are likely to cause many users to cut the sound and vision links to a minimum. The soundest decision may be to wait until the next iteration of software comes along that can exploit the extra graphical and DSP processing power that will become available in this year's PC updates. Then conferencing really will have the potential to sing and dance.

sharing is available — a curious omission indeed given the nature of the program. To make up for this, Conference offers what Netscape calls Collaborative Browsing. This allows one user to lead the another through any Web surfing experience — although it did exhibit a few seconds' delay in testing — to provide either a demo trip around a particular site, or a training session for new users. However, the value of this seems somewhat limited. In terms of repeatability of connections, Conference uses the built-in Messenger address book to keep tabs on and set up connections very rapidly. This system seemed to work slightly better than Microsoft's server allocation plan, with less apparent congestion on a local basis.

Netscape claims quality audio is

available with a minimum 14.4Kbps modem link, but again, reality trails somewhat in local conditions. On a LAN, however, audio was excellent. This is a result, no doubt, of the proprietary standards used for audio and data. Like the competition, Conference does not include any specific security features, but may be less sensitive to firewall restrictions than NetMeeting, thanks to its close integration into Communicator. This, however, means the program is at present not available as a stand-alone application, although Netscape says it may implement this if OEM demand is high enough. Netscape is also touting the plug-in capability of Conference, although none was available at the time of writing.

In use, the program itself is fast, and

the interface is slightly less fussy than NetMeeting. The whiteboard tools are comprehensive and simple, but the lack of document and application sharing is a real downer for what is otherwise an excellent and usable piece of software. In some ways, it looks as though Netscape built Conference into Communicator because Microsoft included NetMeeting in IE4. But in terms of utility, it only really has cross-platform capability to recommend it.

■ Distributor	Netscape
■ Phone	(02) 9870 2200
■ Online	http://www.netscape.com.au
■ Price	Included in Communicator
■ In short	Nice looking and easy to use, but sadly lacking some essential features.

Feature comparison

Features	Netscape Conference	Microsoft Netmeeting
Whiteboard	Yes	Yes
Text chat	Yes	Yes
Audio chat	Yes	Yes
Videoconferencing	No	Yes
File transfer	Yes	Yes
Application sharing	No	Yes
Collaborative browsing	Yes	No
Voice-mail support	Yes	No
Multiuser/one-to-one conferencing	One-to-one	Multiuser (hybrid)
Hierarchical access	No, equal access	Yes
Size and space requirements	10M to 16M depending on type of installation	3M standalone; 50M bundled together with IE4
Cross-platform availability	Over 15 platforms	Only for Win 95 and NT 4.0
Minimum modem requirements for text chat, whiteboard and file transfer	14.4Kbps	14.4Kbps
Minimum modem requirements for audio/video	14.4Kbps	28.8Kbps
Network protocols supported	Modem, ISDN and LAN	Modem, ISDN and LAN
Encryption security	No	No
Card or peripheral requirements	Soundcard	Soundcard and video camera (optional)
Training requirements	Online training manuals/help pages	Web tutorial/help pages
Standards support	H.323, RTP	H.323, T120

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What other conferencing options are out there? **By Jeremy Torr**

The alternative approach

The two main players in the conferencing market are obviously those with browsers to match. But there are many options available in the rapidly growing conferencing category as other software development companies see the potential. From the most basic shareware chat products right through to the corporate-level virtual amphitheatre, there is something available if you look long and hard enough. Bearing that in mind, the available software does tend to originate from a background of IRC products which have been beefed up to accommodate extra capabilities. As such, many are slightly wanting in terms of functionality and integration when compared to the likes of NetMeeting. However, if you are using an unusual browser or a relatively ancient operating system, or have specific requirements that don't hinge on lots of audio and video capacity, it may be worth looking at one of the following options.

Post On The Fly Conference (<http://www.homecom.com>)

This program offers a less interactive approach than some of the other contenders, and relies on the use of a Web server to act as the conference hub. Based on a Unix or NT server, it enables dial-up or LAN-based conferees to exchange audio, video, graphics and documents, but only through a set of unique real-time home pages. Users post the data onto their home page, which can then be accessed by any other conference partici-

pants as and when they require or are requested to. This means the level of interactivity is not so high, but does allow fast and easy access to all types of users who log on, irrespective of their equipment. DES encryption is offered for 'private conference' registrations, and the software can include filters to screen unwanted data or gatecrashers.

CU-SeeMe 3.1 (<http://www.wpine.com>)

Originally designed as a video phone application, CU-SeeMe has been ex-

full video on anything less than 28.8Kbps connection is a forlorn hope with CU-SeeMe, however. White Pine recommends audio only for 14.4Kbps connections.

Although the program uses automatic compression, the user still has the option of configuring their setup to suit the connection used (modem, LAN, ISDN), which can help avoid the frame refresh waiting encountered in some other video-conferencing packages, but this can compromise quality slightly. Video stills can be clipped and copied to the clipboard if required, to be checked or used offline in other applications. Unfortunately, all this video capability means the pinch has to be felt elsewhere — in this case in the document exchange arena.

CU-SeeMe does not have built-in live document or application sharing, which means any exchange must be accomplished through FTP or similar external software — this is not very smooth, and a definite omission for most business-use scenarios. However, for duplicating 'round table' meetings where the accent is on

talk and gesture, CU-SeeMe is probably still the main choice.

PictureTalk Communicator (<http://www.picturetalk.com>)

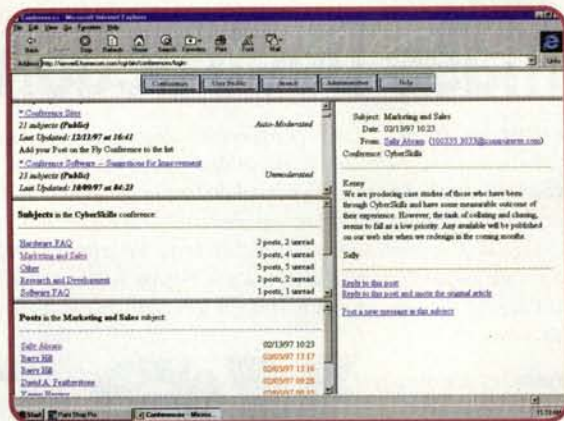
Another host-based system which allows Windows 3.1, 95, Mac and Unix users to exchange data but without the audio or video add-ons that some other programs offer. It utilises a sort of swappable whiteboard system in which only one participant at a time can control the data being transmitted to the main host server, and thence to the other participants. Meetings take place with the whiteboard 'controller' position swapping from person to person, which could prove a little laborious in practice. The program's big advantage is its cross-platform capability. It's big disadvantage is the lack of direct document and application sharing.

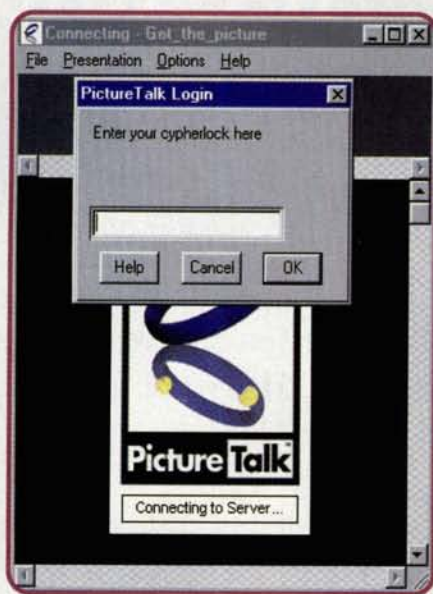
The system includes smart network analysis to configure the compression rate



panded in its capability to encompass whiteboard, text chat and file exchange. The program works either directly with other participants or via the White Pine Cafe server or other 'reflector' site. This approach has the benefit of enabling users of NetMeeting, Intel VideoPhone and other H.323-compliant packages to also be connected using the standards-based compression codecs.

Apart from this interconnectivity, the big advantage CU-SeeMe has is the ability to cope with unlimited multiple video connections at once. The number is usually dictated more by screen space than connectivity issues. The program allows for both LAN and Net connection, and is due soon in a Mac version as well as existing Windows 95 and NT versions. Trying to get





to a speed that suits the particular client, which makes network systems work better, especially if there is a large mix of machines on the same LAN. PictureTalk also has the ability to provide private meetings with the use of a cypherlock. The password is exchanged between conference participants, who can then exclude any unwanted guest on the system. Best of all, PictureTalk is free — users merely have to download the client and log onto the main server. But if you need shared information and applications, this software is possibly not quite meaty enough.

Atrium Internet Conference (<http://www.vocaltec.com>)

This heavyweight business solution from VocalTec offers multiuser audio, document exchange, and even OLE editing of Microsoft Office files on the fly. Designed for Windows 95 and NT, the

system also allows historical annotation of existing documents, a full view of all conference delegates in real time and text-based chat for those without audio. It uses the VocalTec Conference server as the hub for all conferences or forums, and can be set up with a controller or moderator to oversee the session in order



to avoid conference bad manners. Alternatively, the AutoVox setting allows the first person online to speak, locking all other users out until they let go of the line.

Its real advantage, however, is not the audio conferencing, but the ability to load Office applications such as Word, Excel and PowerPoint direct from the taskbar, and to copy or clip sections from any of these transparently across the conference. A built-in browsing applet, whiteboard screenshots and annotating options are also supplied in the package.

PlaceWare Auditorium (<http://www.placeware.com>)

More a lecture platform than a pure conferencing tool, Auditorium is a server-based system running under NT and Solaris. It uses a series of comprehensive

applets which allow 'visitors' to watch the main presentation, chat among themselves, vote for resolutions, ask the presenter questions and even be told to 'shush' if they annoy other audience members. The client software runs on most standard browser software that supports Java.

Although there is no whiteboard as such, the presenter can take textual questions from other participants as they present a slide show, give a lecture or pose questions. The attendees can signal a general audience feeling by colour coding their seats — say, red for 'no' and blue for 'yes' in answer to a specific question. The presentation can be shared among several presenters, but equal correspondence between all attendees is not available.

Security-wise, Auditorium is capable of working with any firewall-based intranet that can tolerate Java code transmissions. ■



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(p) places to go

(s) sport

(g) gay & lesbian

(c) clubs & pubs

(w) weather



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Workshop

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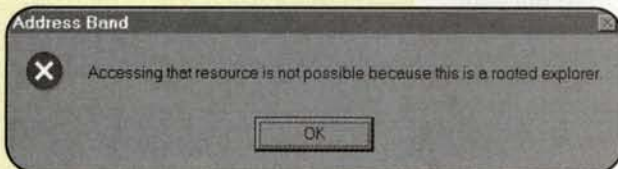
Bug of the Month

This month's bug comes from Marc Butler. There have recently been many rumours that Microsoft has become victim to truth-in-advertising policies. The following seems to prove it.

Marc was running IE4 under Windows 95 (always a hazardous procedure) using the 'Explore from Here' extension from Power Toys 1.1.

He followed these steps:

- Right-click the Start menu on the task bar, and select 'Explore from Here'
- Click on the text box in Explorer containing the text 'C:\WINDOWS\Start Menu'
- Select the text 'Start Menu' and delete it, leaving the text 'C:\WINDOWS\'
- Press the Enter key



The result speaks for itself, I guess.

For his commitment to truth, justice and the Australian way, Marc receives a copy of Microsoft FrontPage 98.

Get involved

All files mentioned in Workshop can be found on **apcmag.cd** or downloaded from our Web site at <http://www.apcmag.com>. Here you will also find a number of online discussion forums where you can discuss technical issues or just voice your opinion on any related topic.

Don't forget that Workshop is a reader-input section. Feel free to contact us by sending any ideas, comments or criticisms you have. You can email us at workshop@acp.com.au or send snail mail to APC Workshop, PO Box 37, Sydney NSW 1028.

Ashton Mills, Workshop editor

Welcome to Workshop, the section dedicated to bringing you all manner of tips, interesting information and do-it-yourself tutorials. Within these pages you will find useful shareware, informative operating-system-specific columns and easy-to-follow programming tutorials.

If you haven't yet investigated our online discussion forums, surf to **apcmag.com** and check out the Workshop section. The forums have been growing and have become a useful respository for those seeking help with their operating system of choice.

If you would like to let us know what you think about Workshop online, please feel free to email your suggestions or criticisms to workshop@acp.com.au.



Tech Talk 132

Technobabble reveals all about the mysterious technology of printing, while Step by Step explains how to configure

your mail program to remove spam.

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Windows 95 returns to basics and explains some often overlooked methods of file management. OS/2 explains what to do when things go wrong, and Mac OS looks at a collection of distinctly Mac Internet applications. Linux is the first part of a two-part series on setting Linux up as an Internet or intranet server.

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All the files mentioned here can be found

on this month's **apcmag.cd** in the Workshop section. If you have any 'Site of the month' recommendations, please send them to workshop@acp.com.au. If we include yours, we will reward you with the prestige of being credited on the page.

Win! Win! Win!

Workshop is on the lookout for the most interesting, strange, funny or downright weird software bugs you can find. These include code snippets, examples of features that function poorly, or procedures for crashing a particular application. Anything and everything that is buggy deserves mention.

Send us the bug of your choice via email or snail mail, and you'll be in the running to win a copy of **Microsoft's Visual Studio**. Feel free to send screen captures or example code listings, as well as details of how to duplicate the bug, if applicable.

Winners will be announced in the May edition of APC, and the winning bug will appear in the Bug of the Month column. So start hunting!

Ever wondered why some printing technologies are better than others? **By Nathan Taylor**

Technobabble

There are a number of different printer technologies vying for control of the printer market, although inkjets seem to be the winner at the moment. This month we'll take a look at some of the printing technologies of the past and present.

Dot matrix printers

Something of a relic from the early days of printer technology, today dot matrix printers are all but extinct in the home. However, they are still going strong in some niche markets such as high-volume, low-cost printing of corporate data, and for printing on carbon paper to create exact duplicates of a single document.

Dot matrix printers use a head containing nine, 18 or 24 pins which act as hammers to force ink out of a print ribbon wedged between the head and the paper. Using permanent magnets which hold the pins back against the force of a spring, dot matrix printers work by sending electrical currents to electromagnets designed to neutralise the permanent magnets, which releases the pin to strike the ribbon and thus force a blot of ink to appear on the paper behind it. The head itself moves left and right across the paper, releasing and contracting the appropriate heads in (presumably) the appropriate places.

The more pins in the head of a dot matrix printer, the better the quality and the faster the print speed. The finer pins found in later-generation dot matrix printers also afford greater definition. In addition, most dot matrix printers offer something called near-letter-quality (NLQ), which causes the print head to pass over the same line a number of times, increasing the density of the dots and providing a better-quality image. Colour dot matrix printers are also available. These go over each line four times, once each for black, cyan, magenta and yellow.

As a rule, dot matrix printers are not terribly fast, tend to be rather noisy, and produce prints of poor quality by today's standards. The devices and ribbons are rel-

atively cheap, however, and the ribbons don't just run out like inkjet cartridges do — they slowly fade over time.

Inkjet printers

Inkjets have the lion's share of the printer market, particularly for the home. Compared to dot matrix printers, inkjets are quiet, fast, and able to produce very high-quality images. Since Hewlett-Packard started selling the first product of this type in 1984 (it was actually Canon that discovered the process in 1977, but it was slow to bring an actual product to market), the price of these printers has dropped dramatically and the quality has been vastly improved — the first inkjets produced quality no better than that of dot matrix printers. They still print line by line, however, so they aren't the fastest printers available, although they do offer the highest resolution.

There are actually several types of inkjet, the most common being thermal inkjets, used in printers manufactured by Canon, Hewlett-Packard and Lexmark, among others. Other types of inkjet include the *piezo* inkjets pioneered by Epson and phase-change inkjets, primarily used by Tektronix in some of its models.

Thermal inkjets (known as 'BubbleJets' if they're from Canon) use heat inside their print heads to boil the water-based inks inside the heads. This boiling produces tiny bubbles, which are kept from bursting by carefully controlling the temperature in the nozzle of the head. When a dot is required, the print head warms the nozzle, causing the bubble to burst, thus spraying the paper with the ink. Hundreds of such bubbles can be produced and burst every second.

Unfortunately, the heating of the print heads slowly wears out the head, meaning that it has to be replaced quite frequently. Most manufacturers of inkjets overcome this by building the print head into the ink cartridges, so that when you replace the cartridge, you replace the head as well. This does make for very expensive cartridges (an inkjet cartridge typically costs \$40 to \$60), and is a bit wasteful, since the heads will generally last longer than the ink cartridge. Some manufacturers allow you to replace the heads and cartridges separately.

Epson uses a rather different technology in its inkjet printers. Piezo inkjets use what is called *piezoelectric crystals* in their print nozzles, which have the unusual property of bending when a voltage is applied to them. So to project ink onto the paper, the

Some general printing terms

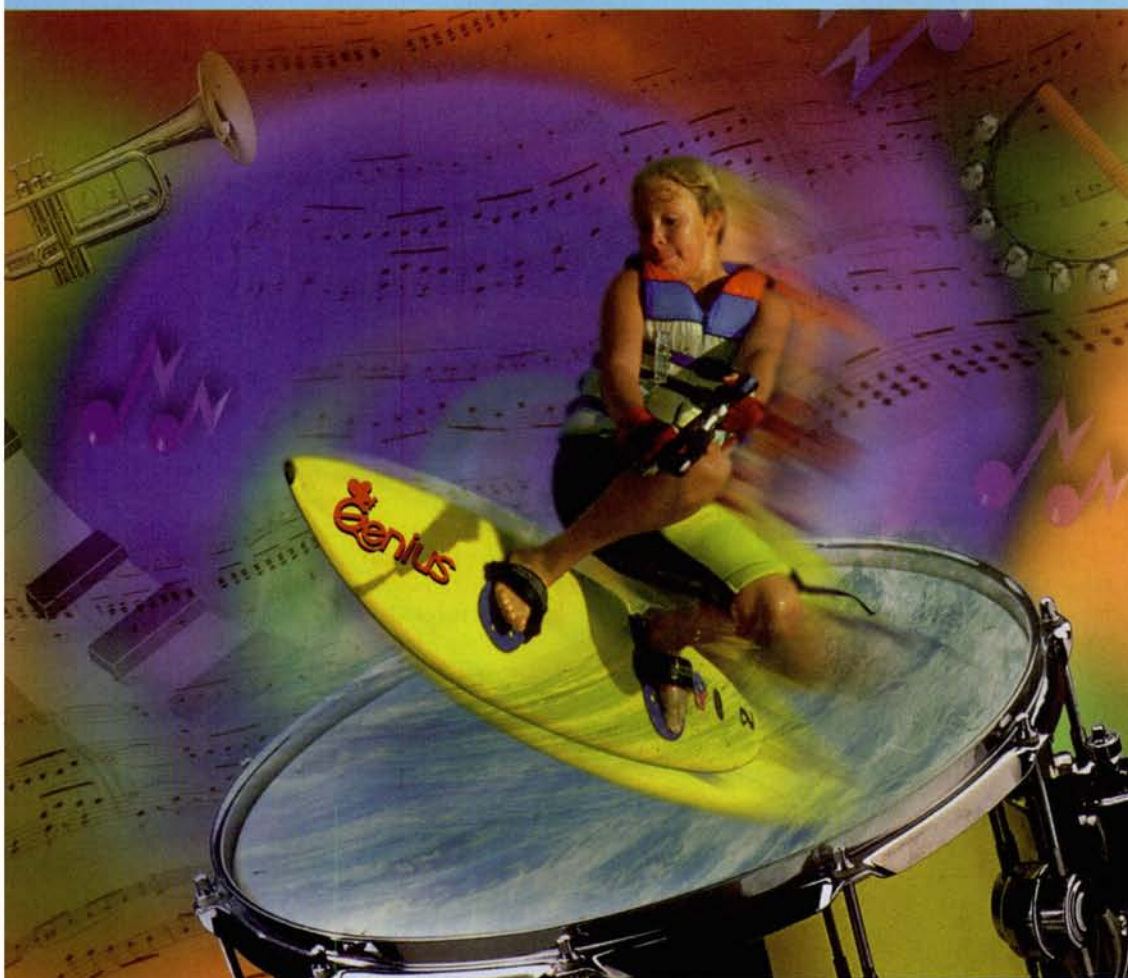
dpi: Dots per inch. Literally refers to the resolution of which the printer is capable. A printer with a dpi of 1,200 by 1,440, for instance, can print 1,200 pixels horizontally within the space of an inch, and 1,440 vertically. It is not the be-all and end-all when it comes to quality, however.

ppm: Pages per minute. Depending on a printer's print engine and controller chips, different printers will print at different speeds. Manufacturers will quote a speed which is usually a best-case estimate (what is printed has a big impact on the print speed), however, so be warned.

PostScript: A system developed by Adobe in 1985 as a page description language. Rather than transferring a bitmap of the desired image, it tells printers how to lay out the page and what text will be used. Many printers will come with PostScript fonts built in, and so do not need to draw the information regarding the composition of letters from the computer. Theoretically, this is an efficient way of managing printers, as it leaves the printer to do most of the work, rather than the computer.

PCL: Printer Control Language. Developed by Hewlett-Packard, this is a standard method of communication with inkjet printers. Currently in its sixth major revision, called PCL6.

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printer fills the nozzle with ink and applies a voltage to the crystal, which bends in the middle, forcing the ink out of the nozzle and onto the paper. Epson claims this technology has numerous advantages over thermal inkjets, including better registration (thermal inkjets can sometimes produce 'splattered' and 'haloed' pixels because of the bubbles used to transfer ink) and a longer-lasting head, so the heads don't have to be replaced with every ink cartridge (this doesn't seem to stop Epson from charging the same price for cartridges as everyone else, however).

The least common form of inkjet is the phase-change or solid inkjet printer. These use specially dyed wax, which is melted on demand and kept in a reservoir in the nozzle of the print head. It is then mechanically squirted onto the paper, where it quickly cools. Later models also incorporate a cold fuser, which rolls the wax on the paper flat after printing.

All inkjets will work on plain paper, although for best quality, specially coated (and often very expensive) media are required. The coating on this media is designed to absorb and hold ink, whereas plain paper will often diffuse ink dots, creating a 'bleeding' effect.

The newest trend in the inkjet sphere does not involve transfer technology. Rather, the major inkjet manufacturers are looking at expanding the colour range of their printers. The major vendors, including Epson, Canon, Lexmark and Hewlett-Packard, have all introduced printers which go beyond the standard CMYK colour scheme, and incorporate additional inks to produce output closer to real-world colour (good skin tones are an important goal). They appear to be targeting digital camera users, but claims of 'photo-quality' (which appear in just about every ad for a colour inkjet printer) are still dubious at best. Still, they seem to be getting closer by the month.

Laser

Laser printers actually developed from a process developed in the 1960s by researchers at Canon and used in Canon photocopiers. Once again, although Canon developed the technology, Hewlett-Packard was the first to implement it in a commercial product. In 1984, the first LaserJet was unleashed upon the world. Since then, laser printers have found a number of industrial and private uses, although their cost and general bulk has been prohibitive to their take-up in the home.

Some other types of printers

Character printers: A direct evolution of the typewriter, character printers — also known as daisy-wheel printers, thimbles and tulips — used hammers with specific characters to print on paper. Much as in a typewriter, these hammers struck a ribbon, forcing ink onto the paper behind the ribbon in the shape of the character etched on the hammer. Obviously, these printers were only useful for printing text (although the invention of character graphics proved to be a popular pastime) and were painfully slow and loud, although they did produce text at the quality of a typewriter. These were the first types of computer printers, preceding even dot matrix printers.

Dye sublimation printers: Also known as dye diffusion printers, these are an evolution of the thermal transfer printer (see below). They use a similar mechanism, but instead of using inks, dye sublimation printers use (as the name suggests) penetrating dyes on the paper. This enables the makers to have multiple levels of intensity for each dot (usually 256); dots can be smaller or larger, allowing a greater range of possible colours. These are the true 'photo-quality' printers, but this is reflected in very high prices and even higher running costs.

Plotters: Robot-and-pen kinds of devices, rarely connected to standard PCs. These devices use a pen connected to a mechanical arm to draw on a piece of paper. There

are two basic kinds of plotter: flatbeds and drum plotters. Flatbeds have paper laid flat across a surface, and the pen moves along the X and Y axes to draw the desired shape. In drum plotters, the arm with the pen can move in only one dimension, but the media is wrapped around a drum which rotates as required to bring the right part of the page under the pen. Plotters are measured by precision, rather than dpi (because they use lines, not dots).

Thermal printers: These come in two basic types, the direct thermal printer and the thermal transfer printer. Direct thermal printers use special, thermally sensitive paper, which darkens when heated (which is the task of the printer). Low power consumption, a lack of moving parts and a minimum of components make these printers ideal for mobile applications. Thermal transfer printers, also known as wax transfer printers after the agent they most commonly use, use a carrier (often some kind of ribbon or 'sheet' of ink) and a heating element to melt the binding agent holding the ink on the carrier, which is usually, but not always, wax. The ink is then transferred to the paper, where the binding agent cools, binding the ink to the paper instead of the carrier. While these printers are slow, wasteful of resources and costly, they do produce the best colours to be found in PC printers.

Laser printers offer very high-quality printing (even at low dots-per-inch ratings), fast output and long life spans, making them the ideal office printers.

Their operation is based around certain photoelectric principles. Some materials, such as selenium, modify their electrical conductivity in response to their exposure to light. Laser printers exploit this phenomenon by effectively 'drawing' images on a drum made of these materials and applied with an electric charge (the charge is applied to the drum using what is called a *charging roller*). Called the *optical photo-conductor* (OPC) drum, the charge drains away from those areas of the drum which have been struck by the laser but remains in those areas which have not been struck.

The next stage is the application of the toner, a fine dust-like chemical of the desired colour. A device called a *developing roller* spreads particles of toner onto the OPC drum, and the toner sticks to the parts of the drum which still have an electrostatic charge. The printer then runs a piece of paper between

the OPC drum and yet another roller, called the *transfer roller*. This forces the toner off the OPC drum and onto the paper, where it is held in place by a slight electrostatic charge.

In the final stage, the paper with the image is run between a *fuser* and a *backup roller*. The fuser, which has been heated to a very high temperature (200°C or higher) melts the toner, bonding it with the paper. The printer then spits it out, ready for reading. Meanwhile, the OPC is cleaned and readied for the next piece of paper.

The nature of this process means that very good solid blacks and colours are achieved, as opposed to the dots used by inkjets and dot matrix printers to compose images. It also means you don't need special media to print on.

Colour printing is possible — it simply requires a pass for each of the four constituent colours. Some printers use the same OPC drum for this; other printers use four separate drums. Either way, colour laser printers are apt to be very expensive — in the region of \$10,000 and up. ■

Spam-mails are downright annoying. Fight back by learning to block unsolicited email from your sight forever. **By Daniel Rutter**

Step by Step

Spam is bulk unsolicited email, usually of a commercial nature. For most users it's no big deal — so you get an email advertising a get-rich-quick scheme, a pornographic Web site or time-share apartments in Botswana once a week, or even twice a day — who cares? Sure, technically it's costing you money and time but the actual expense is negligible.

Some people, however, have a bigger problem with spam. Post messages to Usenet with a valid reply address and presto, the incredible business opportunities will start popping up in your mailbox. Make your email address known by filling in an online survey, joining a mailing list, registering for an email address directory or letting your Internet Service Provider give your address out and homeopathic cancer cure advertisements will not be far away. And if you've got a Web page with your address on it, anticipate a variant of the Nigerian Megabucks Scam arriving in the near future.

There are two sides to avoiding spam — stopping it from being sent to you in the first place and avoiding ever seeing the stuff.

Stopping spammers sending junk to you is difficult. Considering anything that makes your email address visible to anyone else can put you on a database, and these databases are quite freely traded and very poorly targeted, all you can do is try to keep your address as private as possible and deal with the problem at your end if it gets out of hand.

If your ISP gives you access to a good old-fashioned Unix shell account with the Procmail program installed, you can do spam filtering right there on the server by creating your own filters or using one of a number of prebuilt filter sets. For an example, check out <http://www.best.com/~ariel/nospam/>. However, since many users only have PPP access these days — or would rather walk on broken glass than use Unix — Procmail isn't always an option.

Fortunately it's quite easy to deal with 'domestic' spam problems without enjoin-

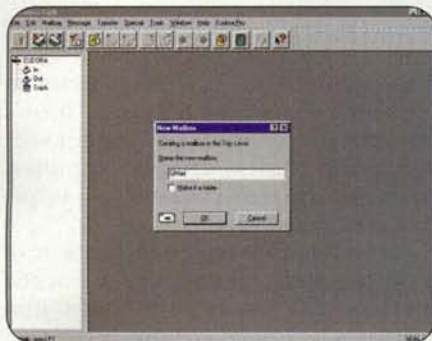
ing your ISP to reconfigure its mail server, or emailing the postmasters of distant domains to complain about their errant users. Just about all of the popular email clients allow you, at the very least, to filter mail you have downloaded from the server. Some can do the filtering before they download, saving you from spending online time collecting useless mail. Since even quite serious spam problems only cost a minute or so in extra downloads a day, post-download filtering is adequate for most purposes if it's properly configured.

Filter fun

If your email program supports filtering you can set up a basic line of defence against junk mail, if only by sending mail from people you know to one folder and everything else to another. Alternatively, you can try to spot the spam automatically.

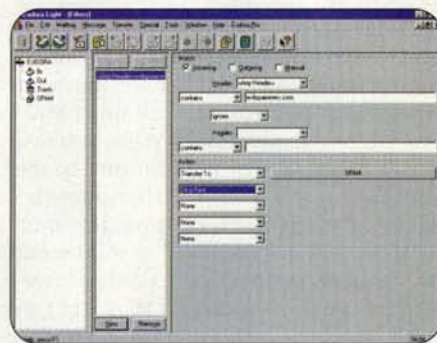
Probably the most popular standalone email client is Eudora, either in its free Light or commercial Pro incarnation. The current versions of Eudora and Eudora Light have the ability to filter messages based on any header field and on the text of the message. Eudora is available for both PC and Mac and its filters work the same on both platforms, hence I've chosen it for the following example. To create a basic anti-spam filter in Eudora which catches mail from a particular domain, try the following:

Make a spam mailbox by selecting New from the Mailbox menu. Call the new mailbox SPAM or whatever takes your fancy.



Next click Tools, Filters and then the New button to create a new filter. Select the Incoming box and in the Header drop-down menu select <Any Header>. Leave the box that says Contains alone, because that default setting is fine, and type in the box to the right of it the domain name of your least favourite spammer.

Click Action, select Transfer, and then click the grey bar to the right and select your spam folder as the destination. Set the next Action box down to Skip Rest, which will tell Eudora not to send this message to any of your other filters if it meets the criteria for this one. Hit Ctrl-S to save your new filter and you're done.



Filtering messages this way is reliable, but it's also time-consuming because you need to make a specific filter match for every spam domain. It's worthwhile if you're continuously pestered by junk mail from a particular domain, but using domain filtering to keep the usual drizzle of rando-spam out of your face takes more time than just deleting the messages.

Funkier filters

If any header contains 'recipient list not shown' or 'recipient list suppressed', there is more than a small chance that the message came from cheap and nasty bulk emailing software using a huge blind carbon copy (bcc) list. Some legitimate automatic emailing systems — programs that send registration or receipt numbers, for example — also put this text in the head-

ers, however, so don't assume all such email is spam.

On the other hand, if any header contains the string 'cyberpromo' you are almost certainly the proud recipient of spam from the Spam King himself, Sanford Wallace. While you're at it, you might as well match 'savetrees' in any header as well, since savetrees.com is Cyberpromo's favourite alias.

Still on Cyberpromo, make another filter that matches 'tomsnet!.com' or '45net!.com' in any header since these are also likely to turn up in the Spam King's wares. And if your email program supports message text scanning, filter for messages whose body contains '@answerme.com' — Answerme is Cyberpromo's email autoresponder service so spammers can be contacted by customers without the spammers having to use valid reply addresses.

If the creator of your spam is using Extractor Pro to build their database and fire their messages off it'll put an X-Mailer header on all of its messages containing the string 'Extractor Pro'. Just look for that string in any header.

Email Blaster is another spamming program which advertises itself in all of the mail it sends — just filter for messages whose text or headers contain 'EMAIL BLASTER' or 'EmailBlaster'. While you're at it you might as well filter for any header containing the string 'Cyber-bomber', which is Cyberpromo's spamming software.

Have you ever received a valid email that started 'Dear Friend'? Neither have I — filter message bodies for it. A 'To' field that contains 'friend@public.com' is another dead giveaway.

Using mail programs like Eudora that let you match text in the body of a message may also allow you to make grab-bag filters that will spot most rubbish mail. Making a filter that matches 'business opportunity' and '\$\$\$' anywhere in the message body will catch a lot of pyramid scheme spam (the single word 'Camaro' is pretty good for this as well, as are '\$50,000' and '90 days' in the same email), but this filter may also catch mail from friends talking about the problem, or humorous parodies thereof. If your email correspondents are not prone to overexcitement, matching anything with three exclamation marks in the 'Subject' line is another quite effective way of spotting spam.

Considering multi-recipient emails usually don't have your email address in the 'To' or 'cc' fields, setting a filter that matches any message that doesn't contain your address in these fields is a very help-

ful strategy. If you subscribe to any mailing lists you'll need to set them up as exceptions to this filter. Since mailing lists should always have the same 'To' or 'cc' address, this is easy — the mailing list spotting filter just has to come before the spam-spotting filters.

Whatever you do, make sure that messages that match your filters are sent to a spam folder, not to the mail program's trashcan folder or just deleted. Unless you're chronically short of disk space, a

One point about replying to spam — if you receive a piece of unsolicited commercial mail that says you should reply and say 'remove' in the body of the message to get off their mailing list, you may find that doing so simply marks your account as 'active' in their database and results in more spam. Spammers, generally, are not renowned for their ethics.

If you're using Eudora Pro or one of the other email clients that lets you auto-reply to messages based on con-

Have you ever received a valid email that started 'Dear Friend'? Neither have I — filter message bodies for it.

cursory check of the spam folder every week or so will be fine to keep the dead weight down and you'll never accidentally lose a valid message just because it happened to smell a bit spammy.

Other programs

Most email programs have filters similar to Eudora's. Pegasus Mail, for example, has filters more powerful than Eudora's and they can be programmed in considerable detail to highlight text, run programs, send messages to other filters or even mail binary files to people depending on the content of received mail.

Quickmail Pro has filters similar to Eudora's, but makes it easy to toggle them on and off. Similarly, GroupWise lets you independently toggle particular filters. On the other hand, Lotus Notes can't filter, full stop. Older Microsoft email clients are just as bad, although the current Outlook Express and Outlook 98 have got with the program and now provide reasonable filter features via the Inbox Assistant. Netscape's Messenger email program has filters as good as Eudora's and can also do full-text searching on the server, which is more than Microsoft has managed yet.

Responding

This column is primarily about avoiding spam, not about retaliating to it. There's not enough space here to comprehensively deal with what to do to punish spammers for their misdeeds, or just get them out of your face.

For a complete guide to this sort of proactive spam control, check out the alt.spam FAQ list at <http://ddi.digital.net/~gandalf/spamfaq.html>.

tent, it's easy to send a standard I-don't-like-spam email to anybody who matches your spam filter. This is not, however, a great idea because most 'pro' spammers have a fake reply-to address as a matter of course — or use one that belongs to an innocent victim. Even if your auto-reply gets through, it's most likely going to achieve nothing or attract yet more spam because you've once again just marked your account as 'live'.

If you want to reply to spammers check the domains from which the spam most often comes and send a polite message to postmaster@[domain name], along with the complete header from the message in question. The text of the spam isn't that important, but the header information contains lots of clues to help catch crafty spammers. Many mail programs by default suppress the complete header information and some mail servers strip it out completely. In Eudora you can view the complete headers by clicking the BLAH BLAH BLAH button at the top of the message viewing pane.

Complaining to the postmaster like this might result in action or, if the domain is faked, an aggrieved 'Yeah, tell me about it' reply from the victim. If the domain owner turns out to be the spammer, you'll simply receive more spam. If the domain name is something like bigbucksnow.com, don't waste your time.

There are plenty of anti-spam crusaders out there, so the average user, thankfully, doesn't have to be one. With a few basic filters almost all obnoxious email can be shot down before you see it, and that's good enough for me. ■

This month's column returns to the basics of working with files. By Travis Simon

Windows 95



One of the strengths of Windows 95 is that it allows you to do a single task many different ways. However, many users don't explore the various options available to find the method of working that best suits them. This month, we're going to return to the basics and explore various ways of working with a computer's fundamental source for information — files.

One file, many applications

In a perfect world, a computer would be loaded with about five applications that performed all the tasks required, and nothing more. Needless to say, it's not always that easy. With a few possible exceptions, it is rare to find a program that satisfies a user's every need. More often than not, a file will require processing from many applications before it is complete.

Webmasters will agree that an HTML page in particular is the product of many separate applications. Often, the basic page is laid out using a WYSIWYG editing program, and refinements are made to the raw HTML file using a simple text editor. For all but the simplest page, it is then necessary to test the page in multiple browsers to ensure consistency across applications and platforms. While it is possible to open each individual application manually, and then open the relevant document from within the file, there are at least two approaches that greatly simplify the process.

The drag-and-drop approach

Nearly every Windows user knows that a file can be stored on the Windows desktop. However, it is surprising how many users aren't familiar with the full power of desktop shortcuts.

The most basic use of a desktop shortcut is to open an application. Right-clicking

and dragging an icon from Windows Explorer to the desktop presents the user with the options to copy the application to the desktop, or to create a shortcut instead. Following the same approach with a file, the resulting shortcut — when double-clicked — will open the file with the application associated with that particular file type.

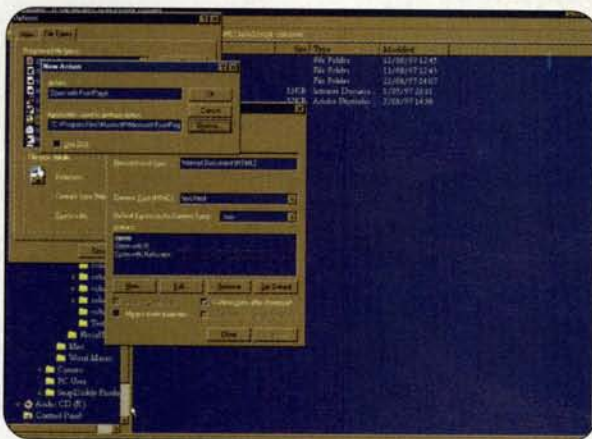
Shortcuts can also be used to provide access to directories on a hard disk. With many nested folders, this can be a convenient method of retrieving and storing documents, simplifying the task of basic file management.

While these options are familiar to most Windows users, fewer users know that dragging a file or shortcut onto a shortcut will open that file with that application. Likewise, a shortcut to a printer can be created, and dragging a file onto the shortcut will print the document. Finally, a shortcut to a file can be dragged onto an open application window, and the application will automatically load the file for editing.

With some practice, this approach to working with files can prove to be extremely versatile and fast. Generally, desktop shortcuts are placed along the outside border of the desktop, and open application windows are placed in the remaining space. A good scheme might be to place files, folders and printers along the left-hand side of the screen, applications along the top, and miscellaneous files along the right. Clicking on a folder shortcut would provide access to a file, which could then be dragged onto an open application or an application shortcut.

The right-click approach

One of the most telling signs that someone else has been using your computer is a



minimised/maximised application window. Some people prefer to work with every application window maximised, which reduces the speed benefits of working with shortcuts. Also, desktop shortcuts use system resources, and many users find them unsightly.

An alternative method of working with files is to use Windows Explorer as a central repository for file and application data. With Explorer set up in tree view, any file on the hard disk is easily accessible, and each file type can be mapped to your favourite applications. This approach allows different programs to be associated with numerous applications, which can then be accessed by right-clicking the mouse.

To create an entry in the right-click menu, open Explorer, click on View, and select Options. Open the File Types tab, and find the extension associated with a particular document. For example, to create new menu options for HTML files, find the HTM extension, which will be listed as either a Netscape HTML file, or a Microsoft HTML file, depending upon which browser was last installed.

With the file type highlighted, click on the Edit button. The Edit File Type box will appear, where you can change the description of the file type, the associated icon, and the actions associated with the

file type. The Action box lists choices when a file or shortcut is right-clicked. To create a new action, click on the New button, give the action a name, and specify the application to perform the action.

With simple actions, such as opening a file with Notepad, make sure that the Use DDE (dynamic data exchange) option is deselected, and click the Browse button to locate the application. This process can be repeated until each required application has been added to the actions list.

Ubiquitous applications

There are some actions that you may wish to have available to every file type, such as an 'open with Notepad' option. For these actions, it is necessary to venture forth into the dark realm of the Registry.

Move to the Windows folder and open the REG-EDIT.EXE program. If you've never used the Registry Editor, be forewarned: you can mess things up to the point where Windows won't boot. However, you can always restore the registry to the last working setting (see the 'Restoring the Registry' sidebar) — as long as you have a DOS boot disk!

When the Registry Editor loads, you may notice that it closely resembles Windows Explorer. Under 'My Computer', you will find six folders, each holding information about different aspects of the operating system and applications on your computer. The first entry, HKEY_CLASSES_ROOT, holds the file type information that we are interested in.

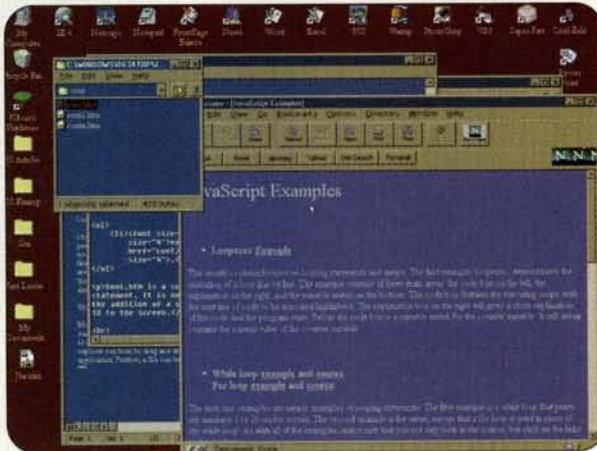
Expanding the HKEY_CLASSES_ROOT folder will reveal a list of registered file types, each folder containing information specific to that file type. Near the top of the list, there should be a folder named '*', which is a wildcard key containing key value pairs for all file types. Within this should be two folders, 'Shell' and 'ShellEx'.

It is likely that there will be no folders beneath the Shell folder. It is here that we need to create the new key values, which will be accessible via right-clicking on any file type. To create a new key, make sure that the Shell folder is highlighted, and choose the Edit-New-Key options from the menu. You can name the resulting folder anything you want, although a descriptive name is suggested.

Selecting the new folder in the hierarchy will display the name/data value pair on

the right-hand side of the screen. The default values are 'Default' for the Name, and 'Value not set' for the Data portion of the key. The '(Default)' name should remain unchanged. Right-click on it, and choose Modify to change the value of the key. You should set the value of the key to be the name of the action to appear in the menus. For example, if you wish to have 'Notepad' appear, type in Notepad. Finally, if you wish for the action to be accessible via a keyboard shortcut, preface the letter to be used as the shortcut key with an ampersand (&) character. For example, the value '&Notepad' will present the Notepad option with the 'N' underlined, and pressing the 'n' key will automatically select that option.

Finally, you have to create one more key below the current key, following the



same procedure outlined above. The resulting folder (key) should be named 'Command'. Once again, leave the '(Default)' name the same, and modify the value of the key. The value property should be the complete pathname to the application you wish to associate with this action. However, the easiest way to assign this value is to type in the name of the application followed by a percent sign and the number 1 in quotation marks (for example: NOTEPAD.EXE "%1"). When you choose this option for the first time, Windows will complain that it can't find the application. Choose Browse, select the application, and Windows will then remember the location of the program.

Finding the right system

The two methods of working with files presented above can greatly improve efficiency, but as a user you are going to have to find the particular style that best suits your working methods. More than likely, the method that you will eventually settle

upon will be a combination of the two approaches. However, make sure that you give both approaches a fair go so that you can fully appreciate the benefits of each method of file manipulation. ■

Restoring the Registry

So, your computer won't boot because you stuffed up the Registry while trying to change the 'My Computer' icon? If you're going to be poking around in the Registry, you need to know how to save yourself from the damage you are likely to cause. However, exploring and tinkering with the Registry is one of the best ways to tweak your computer to suit your particular needs, and it's relatively difficult to cause irrecoverable damage.

Every time Windows boots properly, the Registry files are backed up for just this kind of problem. The two files are called SYSTEM.DAT and USER.DAT, and upon a successful boot, Windows makes copies of the files and calls them SYSTEM.DAO and USER.DAO.

To restore a misconfigured registry, reboot with the boot disk that you created with the 'create start-up disk' option in the Add/Remove Programs section of Control Panel. You do have a boot disk, don't you?

Boot into DOS, and move to the Windows folder. If you're one of the lucky ones who has never used DOS, you can use the command `cd \Windows`. The prompt should display your current location in the directory structure (which should be C:\WINDOWS>). The registry files are hidden, so you have to 'unhide' them, and then delete them using the following commands:

```
attrib -r -h -s system.dat
attrib -r -h -s user.dat
del system.dat
del user.dat
```

The next step is to unhide the backups and copy them to the new name-space:

```
attrib -r -h -s system.dao
attrib -r -h -s user.dao
copy system.dao system.dat
copy user.dao user.dat
```

You can then hide the files again if you wish using '+' instead of '-' flags to the 'attrib' command. You should be able to reboot with your new (old) registry.

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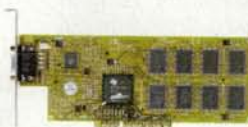
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We all have problems with computers from time to time, operating systems especially. What seems at first an irrecoverable error may just be a slight glitch — and this month we look at how to recover and stop it happening again. By Christopher Relf

OS/2 Warp



Al too often potential users are scared away from OS/2 by the horror stories of installation and system recovery problems. Although plenty can go wrong with any system, let's look at how to make such occurrences rare and painless.

Problems during system startup

Start-up problems are the most common gripes of OS/2 users, usually due to configuration errors or hardware failures. Generally, this is the sequence of events your PC goes through when you power it on:

- The processor resets and starts the load sequence, and the Power-On Self Test (POST) is executed, displaying a memory count, processor type and so on.
- Interrupt vectors are initialised and the BIOS is loaded, determining IDE devices, power management, time, date and so on.
- Input and output adapters are searched. If conflicts arise here, the system is usually stopped.
- The boot sector of the first hard disk is found, loaded and executed. If OS/2 is the only system active, it is loaded.
- The OS/2 loader (OS2LDR) and kernel (OS2KRNL) are loaded.
- The CONFIG.SYS file is loaded and its statements are processed in the following order: BASEDEV, IFS, DEVICE, CALL, RUN and, lastly, SET statements. At this point all device drivers are loaded and trap errors can occur, stopping the system (see below for more information).
- The Workplace Shell starts up the Presentation Manager session. This is where the interface changes from text-based to graphical.
- The desktop starts, icons and the launch bar appears, previously opened folders on the desktop are reopened and previously made connections are re-established.

As you can see, a lot happens, and as such there's a large chance something can go wrong. Never fear, however, as there are plenty of recovery options.

Alt+F1 recovery options were covered recently in this column (see *APC* December,

page 156). The recovery screen is very helpful for many situations, and as described in a previous article, is very configurable. From this screen you can reset to VGA drivers, restore the original or subsequent configuration files, and go directly to an OS/2 command prompt.

Alt+F2 loading driver display is an excellent option if your system stops or pauses during system startup. When the white box appears in the top left-hand corner of the screen, press Alt+F2. Each driver is then displayed as it is initialised. This function is most useful, as it will not interrupt the loading process but will show you any rogue drivers slowing or stopping the system. Once the problem is found you can adjust the parameters of the driver in your CONFIG.SYS file to eliminate it.

Booting from boot disks is often required if you cannot access your hard drive. The three OS/2 Utility Disks will allow you to load OS/2 and then boot to a floppy containing a number of useful recovery files such as: CHKDSK, TEDIT, BACKUP, RESTORE (see below), FDISK and more. Alternatively, you can boot from your original OS/2 installation disks. Just press F3 when you see the 'F3 Command Prompt' option at the bottom of the screen. This will take you to a command prompt with a generic CONFIG.SYS loaded and give you access to your drives.

OS/2 !! SYS014575 and OS/2 !! SYS02027. This strikes fear into the heart of any avid OS/2 user. You turn on your computer and it flashes onto your screen, and then the system stops. SYS014575 simply means that the disk you are trying to boot from is missing the OS/2 start-up file OS2BOOT, and SYS02027 means that the system cannot go any further and you must reboot. This most commonly occurs when you have inadvertently left a formatted disk in your A: drive and the system has attempted to boot from it. Just take the disk out and reboot.

If you don't have a floppy in the A: drive, then the system is possibly trying to boot from a non-bootable hard drive (say, your data drive). If you know that the system is trying to boot from your OS/2 drive,

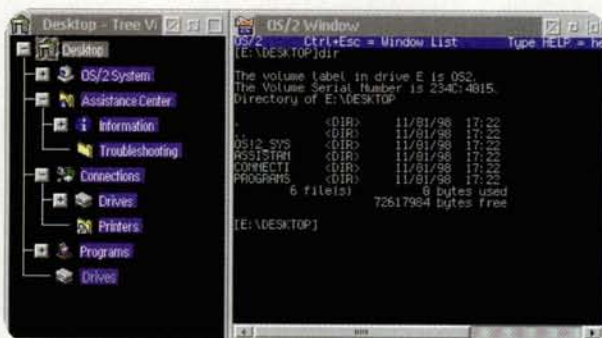


then you are in trouble. Boot using a utility or installation disk (see above) and perform a complete hard drive test on your OS/2 drive. Often CHKDSK is enough to wake the system back up, but you may need to use something like Graham's Utilities' gi to check for surface errors and the like. As soon as the disk is repaired, reboot the system to OS/2 and recover your desktop if necessary (see *Lost Desktops*, next page).

Trap errors are another area that can really upset computer users. When they occur, they spew out a screen of mumbo-jumbo and there is often nothing you can do but reset your computer. As annoying as they are, they do no damage to your system and can often warn of impending hardware failure and doom.

Trap errors come in two main forms. **Kernel trap errors**, while extremely rare, will stop your system. All you can do in this instance is record the hexadecimal data the trap error shows and contact your IBM service representative. There really isn't much you can do yourself, except reset the system and pray that it doesn't happen again. The second form, **application trap errors**, are generally handled by the running application, or the operating system handling the application. Generally, the end product is the message:

SYS3175: A program in this session encountered a problem and cannot continue.



If you're in luck, OS/2 has pre-empted this problem and saved your work before stopping. Again, all you can really do is restart the program.

Lost passwords aren't a joking matter. With all the security required to beat criminals these days, it is often a good idea to change your password periodically. But what happens when you forget your new password? If you've tried everything from 'ChivasRegal' to 'JimBeam' and you still can't get in, no problem! Upon booting into OS/2, chose the Command Prompt option from the Alt+F1 recovery screen (see above). At the command prompt, change into the OS2 directory of your OS/2 boot drive and type the following command: MAKEINI OS2.INI LOCK.RC. After a little while you should see: MAKEINI.EXE — Successful completion..

Restart your workstation and you will not be asked for a password. Hopefully readers will use this technique only to gain access to their own workstations...

Lost desktops are a common problem if you have an older hard drive or are using the FAT file system rather than HPFS. OS/2 defines and describes your desktop through the files OS2.INI (contains display options, file options and application defaults) and OS2SYS.INI (fonts, printer

drivers, and so on). If you know your INI files well you can edit each of these files individually, but I would suggest using the DESKTOP restoration options on the Recovery screen (see above) — that is, if you've been backing up your desktop regularly. Even if you do use the Desktop back-up option, you should also manually

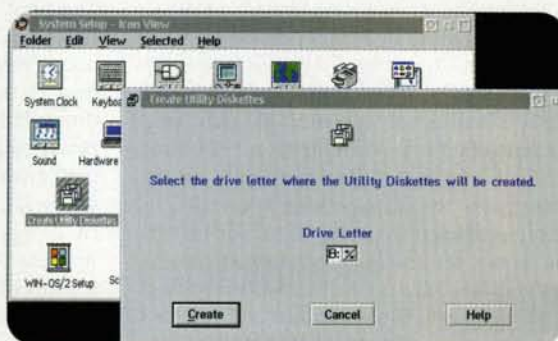
back up the two INI files to a floppy disk. If your INI files are corrupt and the desktop is damaged, you may have to recreate them using the MAKEINI command. Although this will reconstruct your desktop, it will overwrite any customisations you have made. To restore your desktop using this method, do the following:

- Boot to a command prompt using your utility or original installation disks.
- Change to the \OS2\INSTALL directory of your OS/2 boot drive, and delete the OS2.INI and OS2SYS.INI files.
- Make the new INI files using the commands: MAKEINI OS2.INI INI.RC and MAKEINI OS2SYS.INI INISYS.RC. If all goes well you will get the following message: MAKEINI.EXE — Successful completion.
- Delete the WP ROOT. SF file from the root directory of your OS/2 boot drive. Firstly remove the hidden and read-only attributes using the following: ATTRIB "WP ROOT. SF" -S -H. Note the use of the quotation marks, necessary because the filename contains spaces; you will also need to use them when deleting the file (DEL "WP ROOT. SF").
- Remove any floppy disks from your drives and reboot the system.

Your desktop will be rebuilt to its original, although it may take a little while.

Video drivers playing up? Don't worry, it happens to everyone. Sometimes, if you have installed a new video driver, the recovery option of restarting the system using default VGA drivers will not work. Certain third-party video drivers will overwrite your original configuration and a recovery attempt will result in no change at all. The remedy? Just follow the instructions above to recover your desktop, but you only need to replace your OS2.INI file. Again, you will lose any customisations of your desktop, but it's a small price to pay.

Losing folders from your desktop is easier than it sounds. Often you can accidentally put Desktop folders somewhere where OS/2 has difficulty finding them. If you look in the \DESKTOP\OS!2_SYS directory you will see subdirectories representing your desktop folders ('shortcuts' in Windows 95 language). If using HPFS, each of the directories will be listed with their full names, but using FAT will truncate them to 8.3 DOS format. To move a directory (say, FILES) back to the desktop, use the command: MOVE FILES X:\DESKTOP\OS!2_SYS. In HPFS use: MOVE FILES X:\DESKTOP\OS!2 SYSTEM, where 'X:' is your boot drive.■



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The Internet is perhaps the ultimate cross-platform environment, but some software brings a distinctive Mac flavour. By Stephen Withers

Mac OS

While Web browsers look pretty much the same on any operating system, other tools more closely reflect their environment. Microsoft is trying to make Windows look more like the Internet, while Mac developers tend to make the Internet look more like the Mac.

Internet Config

The locally-developed Internet Config system (<ftp://ftp.quinn.echidna.id.au/Other/Quinn/Config/>) is a key element in simplifying the use of Internet software. Created by Peter N Lewis and Quinn 'The Eskimo' — and blessed by Apple to the extent that it is included as part of Mac OS 8 — Internet Config provides a repository for Internet-related user preferences. It is now supported by a variety of Macintosh Internet applications (even Microsoft Internet Explorer), and some programs actually require it. Since it has been placed in the public domain, no licence or other fees are payable by developers or users.

Internet Config would be useful even if it only saved you from typing in your email address and other information each time you installed a new Internet application. While it does that, it goes further by letting you specify the applications to be used to handle different types of data. For example, it can tell the rest of your software to direct http URLs to Netscape Navigator, mail to URLs to Claris Emailer, and so on.

Internet Config provides applications with an API rather than a shared preferences file that's only read when a program is launched, so the information and settings are dynamic. Launch IE, for instance, then run Internet Config and change, say, the Real Name setting. Save Internet Preferences, then return to IE and inspect its Email/General preference settings — the Real Name field will contain the name you just typed into Internet Config.

Internet Config's mapping ability doesn't only apply to URLs; it also provides a way of relating DOS/Unix-style file extensions (for example, PM5 for Adobe PageMaker 5 documents) to Macintosh creator and type codes. The obvious use for this is to correctly set the codes when a file is downloaded (of course, BinHexed files contain this information and set the codes when they are



decoded), but it also means an Internet Config-aware FTP application can use this information to display appropriate icons for files in directory windows (see NetFinder, below).

FTP with style

The most obvious way of making the Internet work like the Mac is to integrate FTP access with the Finder. At one level this can be done fairly easily by supporting drag and drop. This means all you need to do to download a file is to drag it from an FTP window onto the desktop or whichever folder you wish. Similarly, uploading is achieved by dragging an item from a local volume into the FTP window. This is supported by several FTP programs, including the popular Anarchie (a regular on [apcmag.cd](http://www.apcmag.cd)) and Fetch (<http://www.dartmouth.edu/pages/software/fetch.html>). Anarchie's interface resembles the Finder, but Snatcher and NetFinder go further.

Although Snatcher is a discontinued application from now-defunct Software Ventures, there are probably copies floating around the second-hand market. Snatcher has a very clean interface, so if the price is right it is worth giving it a try. Snatcher seems to work happily with Mac OS 7.6, but I haven't yet tried it with 8.0.

If you're happier with a currently supported product, NetFinder (\$25 shareware <http://www.ozemail.com.au/~pli/netfinder/> or <http://www-personal.usyd.edu.au/~vtan/sw/NetFinder/>) fits the bill — just don't confuse it with the Personal NetFinder feature of Mac OS 8's Personal

Web Sharing. One of the especially useful features of NetFinder is that it is capable of resuming partial downloads. This is dependent on server support, so NetFinder's server windows indicate whether or not it is available. Murphy's Law suggests that a long download is most likely to fail when it is almost completed, so being able to carry on where you left off is very comforting. This isn't a NetFinder exclusive, but it is a desirable feature. NetFinder also decodes MacBinary and BinHex files on the fly, reducing the clutter on your hard disk.

Although this article is about look and feel rather than performance, my informal testing suggests Anarchie 2.0.1, Fetch 3.0.3 and Netscape Navigator 4.04 are the fastest, followed by (in order) Snatcher 1.0, NetFinder 1.2.1 and IE3.01a. This indicates that there may still be some mileage in the old trick of setting your browser to use a helper application instead of doing its own FTP transfers.

While the idea of drag-and-drop FTPing is initially attractive, the novelty wears off. I find it more convenient to simply double-click (or click if I'm in a Web browser) on a file to have it downloaded to a preset location. Some people like to reserve a folder for this purpose, but I prefer files to appear directly on the desktop so I'm reminded to do something with them, such as installing the software in an appropriate location then archiving the installer. My experience is that a download folder fills up with clutter.

Another attraction of integrating FTP with the Finder — or at least giving the illusion that you've done so — is that users can have desktop icons for frequently used FTP servers or even folders on those servers. However, practically every FTP program supports bookmarks and they can be used the same way.

X marks the spot

The trouble with bookmarks is that they are application-specific. Double-click on a bookmark created by Anarchie, and that program will be launched even if NetFinder is currently your preferred FTP tool. One way of getting around this problem is to use a separate bookmark application that passes the URL to the appropriate program. Such tools abound

for Web browsers, but there's something to be said for a program that handles a wider variety of data types so you can replace any of your Internet applications without lengthy reconfiguration.

Not surprisingly, generalised bookmark applications exist. Aladdin's CyberFinder is probably the best known in the retail arena, while the \$25 shareware URL Manager Pro has attracted enthusiastic users. One of the nice things about CyberFinder is that it can store bookmarks either individually (for direct double-click access from the desktop) or in libraries (for storage efficiency, as the 'slack space' effect is minimised when multiple bookmarks are stored in one file). Library bookmarks can be dragged into Finder windows or onto the desktop, and individual bookmarks can be dropped into libraries if required.

CyberFinder has the ability to convert browser history and bookmark files into libraries when you double-click them. It isn't clear at this time whether CyberFinder will be revised for Mac OS 8 compatibility. My understanding is that not only does the application interact with the system software, but it was developed using an application framework that is not and will not be Mac OS 8 compatible. Any revision will therefore be a major effort and the company is making no promises.

URL Manager Pro (URLM Pro, \$US25 shareware, <http://www.url-manager.com>) goes beyond its name. While it does provide a place to collect various kinds of bookmarks, routing them according to your Internet Config settings, it also adds functionality to your browser and other applications by adding a 'shared menu'. URLM Pro's shared menu provides easy access to important functions of the program, and a search engine submenu. It also lets you open and close a PPP connection. This feature works with Netscape Navigator (2.0 or later), IE (2.0 or later), Eudora 3.0, Anarchie, Fetch, Claris Emailer 2.0 and BBEdit 4.0. URLM Pro must be running at the same time as the other application, but an optional extension opens it automatically when Netscape or IE are launched. Additional menus can be created for folders within a URLM bookmark document. The program comes preconfigured with a list of Mac-related magazine sites, but any folder can be used. While you can drag bookmarks from a URLM library, it doesn't seem to set the creator according to Internet Config. When I tried this, it always created a Netscape file.

If you'd prefer something free even if it lacks URLM Pro's bells and whistles, try the

oddly named 'what URL?!' (<http://www.panix.com/~nam/whaturl/>). This program provides a home for a variety of URL types, supporting drag-and-drop support for convenience and AppleScript to allow customisability. The program comes with a few AppleScripts, including one to collect the URL currently being displayed by Netscape. If you're using IE, here's a replacement:

```
global pageName
global pageURL

tell application "Internet Explorer"
  try
    set pageNameStuff to GetWindow-
Info -1
    set pageURL to item 1 of page-
NameStuff
    set pageName to item 2 of page-
NameStuff
  on error errorString
    Activate
    display dialog "Cannot get info from
MSIE (" & errorString & ")." buttons "OK"
default button "OK" with icon caution
  end try
end tell

tell application "what URL?! PPC"
  if (pageURL - "") then
    try
      tell document 1
        set theName to pageName
        set theURL to pageURL
        make new url entry at end with
properties {name:theName, url:theURL}
      end tell
      on error errorString
        activate
        display dialog "Cannot insert info
into what URL?! (" & errorString &
")." buttons "OK" default button "OK"
with icon caution
      end try
    end if
  end tell
```

what URL?!'s authors have stopped work on the project due to lack of time, but they are offering the source code to anyone who wants to take over — see the Web page for details.

Search shortcuts

Access to search engines is streamlined with the right add-ons. If you have installed the OneClick macro and scripting software, a free user-written button called WebFinder (<http://www.westcodesoft.com/FTP-But->

tons.html) simplifies the use of a dozen popular Web search engines plus Filez, FTPSearch and VersionTracker. The source code is accessible, so the adventurous can customise the list of search engines.

WebFind Assistant is a standalone \$US20 application that serves a similar function. A restricted demo is available from <http://www.crushware.com>, but it is severely crippled and only allows access to five search engines. Its main advantage over WebFinder is that it allows searching on any term, all terms or exact phrase, and provides control over the number of matches returned. The WebFind Assistant window floats over the browser and is rather intrusive on a 640 by 480 screen.

Time check

Connection timers are useful accessories, especially if you pay for Internet access by the hour, or if you're on a plan that gives a certain amount of free connect time. There are several timers around for the various PPP and other connection tools. Internet Logger (\$US15 shareware, <ftp://sunsite.anu.edu.au/pub/mac/info-mac/comm/tcp/conn/internet-logger-211.hqx>) is very flexible, supporting PPP (with Open Transport PPP or FreePPP), SLIP and manual operation. It can even estimate your bill according to the tariff information you provide. If you're still using MacPPP, MacPPP Timer from the same author is a little cheaper at \$US10 (<ftp://ftp.perpetual.com/pub/mac/conn/mac-ppp-timer-153.hqx>), but doesn't calculate your bill. OT/PPPPremier Timer (<http://www.tiac.net/users/bigplan/>) is free for personal use and in my opinion has the most Mac-like appearance. I suggest you use this if you only want a record of connect time and a button to establish and close connection.

Get (CD) info

Finally, InCDius (<http://www.xnet.com/~grhowes/html/Software/InCDius.html>) is a free Java application for the Mac which saves you typing track and title information for your audio CDs into AppleCD Audio Player so you can pick tracks by name instead of number. InCDius identifies the disc in your drive and collects the information from one of the cddb servers on the Internet (see <http://www.cddb.com>) and lets you save it into the AppleCD Audio Player Preferences file. It's not groundbreaking, but it is slick and a great convenience. ■

This is the first of a two-part series on using Linux as an Internet server, Internet gateway or intranet server. By Geoffrey Bennett

Linux

Due to its reliability, efficiency and low cost, Linux is in many cases the ideal system to use as an Internet server or gateway. The reliability of Linux is quite impressive. It is common for people to report running their Linux servers for many weeks or months without a single crash or reboot. Personally, 327 days is the longest period for which I've had a Linux server continually running. The reliability of Linux in this case was only limited by the reliability of the power supply.

A moderately-sized Linux server can run on a low-end Pentium with 32M of RAM, so a large hardware investment is not required if you just want to try Linux out. Alternately, Linux can be used with high-end hardware for demanding applications; Deja News (<http://www.dejanews.com>), the first Usenet search utility, uses "dual Pentium 133 boxes running Linux SMP, with up to 256M of RAM as well as multiple 1-4G hard disks".

If after reading this article you want some more in-depth information, Robert Hart from Interweft in Melbourne has written a paper on using Linux as an Internet server. The paper is aimed at people with little experience of Linux and is available from Interweft's Web site at <http://www.interweft.com.au/papers/linux-internet.html>.

Internet server

There are many different Internet server applications for which Linux can be used, two of the most common being a Web or FTP server.

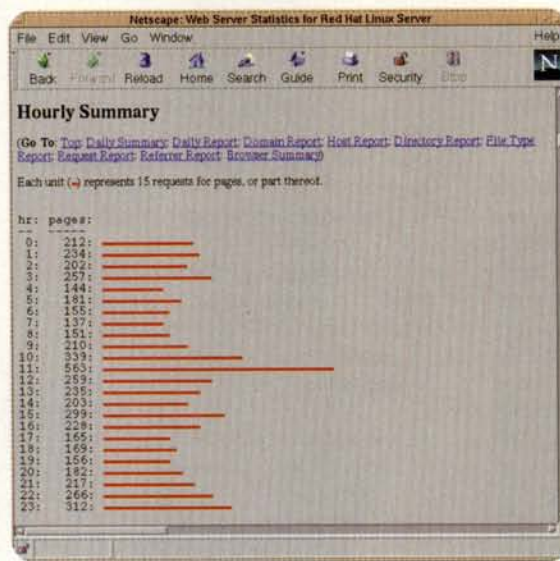
Apache

Apache (<http://www.apache.org/>) is easily the most popular Web server currently in use on the Internet. It has a market share of over 40%, according to a monthly Web server survey performed by Netcraft (<http://www.netcraft.com/>).

You can download and compile Apache yourself, and doing so is not too difficult, although you're likely to find Apache already on your Linux box, included as part of your distribution.

The default configuration for Apache will most likely be stored in the directories /etc/httpd or /usr/local/apache/conf. The

only change you will initially need to make is to add the name of your server into the httpd.conf configuration file. This can be done by searching the file for 'ServerName' and entering the hostname of your server on that line.



Adding documents to your Web server can be done by simply placing them in the appropriate directory, which is defined in the srm.conf configuration file on the line beginning 'DocumentRoot'. The two most common locations for your Web files to be stored are /home/httpd/html and /usr/local/apache/htdocs.

Apache Log files

Once you have a running Web server, you will probably be interested in knowing who is accessing your server and what pages they are viewing.

The server logs generated by Apache aren't very interesting or easy to look at, so to present them in a nice format a log analysis program is needed. According to Georgia Tech Research Corporation, Analog (<http://www.statslab.cam.ac.uk/~sret1/analog/>) is the most popular Web log analysis program. Analog is included on this month's **apcmag.cd**.

The default log file format generated by Apache is known as the 'common log format'. With a little addition, the log files can also include referral and user-agent

information. The referral information lets you know how people are reaching your site and how they move around in it, and the user-agent information can give you an idea of what type of browser people are using to access your site. The extended log format can be enabled by adding this (one long) line to your httpd.conf file:

```
LogFormat "%h %l %u %t \"%r\"  
%s %b \"%[Referer]i\" \"%[User-agent]i\""
```

Each of the percent-letter combinations refers to a particular piece of information to save in the log file when a file is requested from the Web server. For example '%h' is the name of the remote host requesting the file, '%t' is the time that the file was requested, and '%r' tells you what file was requested. The Apache documentation contains a full list of the codes available.

Password-protected Web pages

Setting up private or protected Web pages, where a user name and password are required for access to certain pages, can easily be done with Apache, and instructions appeared in an earlier issue of APC (see APC November, page 169). Although the column mentions the NCSA Web server, the procedure will work just as well with Apache, which was derived from the NCSA server.

FTP server

Linux can also make a good FTP server for allowing users to download files. The FTP server most likely to come with a Linux distribution is the Washington University FTP server ('wu-ftp').

Installed as is, this will let people who have valid accounts on your server log in with their username and password to transfer files. Because anonymous FTP is enabled, anyone will be able to log into your server without requiring a valid password. To prevent anonymous users from browsing where they shouldn't, they are

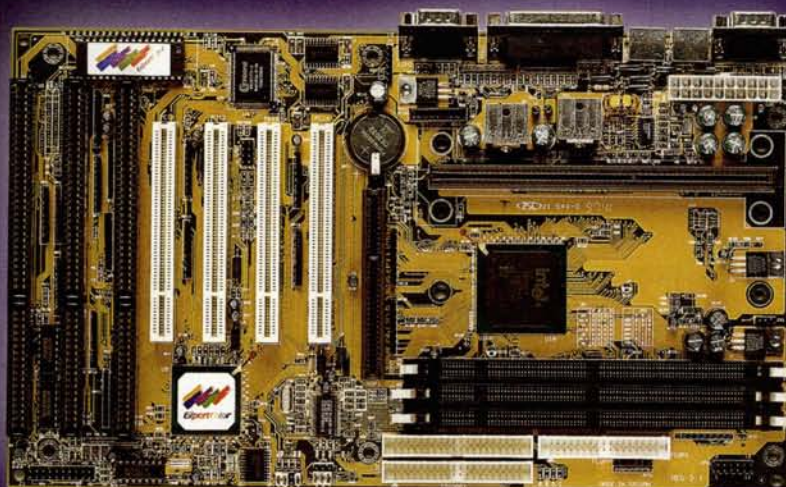
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restricted to accessing files within the home directory of the special 'ftp' user.

The procedure to allow anonymous FTP logins depends on your distribution. It might have been enabled when you installed Linux, or you might have to install an optional package, such as 'anonftp' for Red Hat Linux.

otherwise you will probably need to recompile your kernel (see *APC* February, page 119).

Once you have a kernel with support for IP Masquerading, you need a working PPP connection and a working local area network (LAN). When setting up your LAN, make sure that you only use the IP

kernel module to be loaded. The command to load a module is `modprobe`. For example, to load the module for ftp, you would type:

```
/sbin/modprobe ip_masq_ftp
```

The other IP masquerading modules available are `cuseeme`, `ftp`, `irc`, `quake`, `raudio`, and `vdolive`. For the curious, kernel modules are stored in the `/lib/modules` directory. You don't need to specify a path when loading a module as `modprobe` knows to look in the correct directory.

For more information about IP Masquerading, see <http://www.indyramp.com/masq/> and the Linux IP Masquerading mini-HOWTO.

Web proxy

Once you have a network connected to the Internet, you may want to set up a proxy server to act as a cache. Squid (<http://squid.nlanr.net/>) is one of the more popular proxy servers. Setting it up from scratch can be a bit difficult, so I recommend you use the Red Hat or Debian precompiled package if possible.

You may want to change some of the defaults in the Squid configuration file, such as the amount of disk space it uses. Squid's configuration file is called `squid.conf` and it will be stored in either the `/etc` or the `/etc/squid` directory.

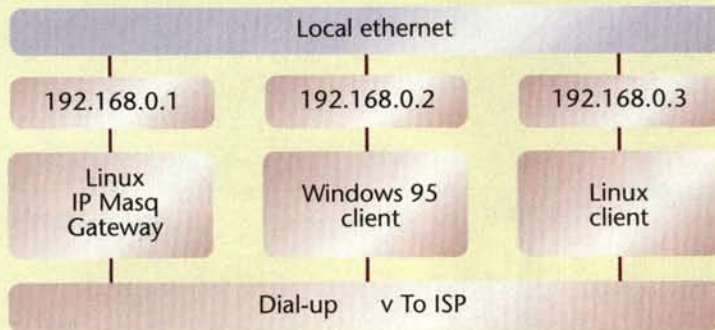
To set the size of the cache, search for 'cache_swap' in the configuration file, and add a line such as this (this is for a cache size of up to 250M):

```
cache_swap 250
```

If your ISP is also running a cache, you may want to use their cache as a 'parent' to yours, which means that if a requested document is not in your cache, it will be retrieved through their cache. To set this up it is best to contact your ISP and ask them what 'cache_host' line you should add to your `squid.conf`.

Where to find the HOWTOs and mini HOWTOs

The HOWTOs mentioned previously should have been included with your Linux distribution and will probably be located in the directory `/usr/doc/HOWTO` or nearby. If you cannot find them or if you just want the latest versions, they are available at many Linux FTP sites, including at sunsite.anu.edu.au in the directory `/pub/linux/docs/HOWTO`. ■



Example IP Masquerading setup with two clients

Once your system is accepting anonymous FTP logins, just place the files you want accessible in `/home/ftp`. It is conventional to use the subdirectory 'pub' (for 'public') as there are a couple of other subdirectories that are required by the system.

Internet gateway

Another great application for Linux is as an Internet gateway. If you want to easily set up a number of computers on the Internet through the one dial-up connection to an ISP, then using the 'IP Masquerading' facility of Linux is the way to go.

When you dial into an ISP, your computer is assigned a single IP address for that session. The problem is, you want to use a gateway machine to connect multiple computers through this single dial-up, but each computer requires its own identifying IP address.

IP Masquerading works around this problem by reading the data packets from other computers on a local network and changing them before passing them on to the ISP so that the packets appear to be coming only from the one IP address that was assigned. When the responses come back, an IP Masquerading gateway will sort them out and redirect them to their appropriate destination.

To set up Linux as a masquerading gateway, you need to have a kernel with firewalling and IP masquerading compiled in. The latest version of Red Hat Linux (Version 5.0) includes these, but

addresses that are reserved for private networks. If you are not sure what to use, the addresses between 192.168.0.1 and 192.168.0.254 inclusive are good choices.

To test your LAN, the ping command (which is included with both Linux and Windows) will come in handy. Type ping followed by an IP address to test whether the computer with that IP address is contactable.

To turn on masquerading, there are two steps involved. The first step is to tell the kernel to not forward any packets unless otherwise directed:

```
ipfwadm -F -p deny
```

The second step is to tell the kernel to look for packets from our network and masquerade them before forwarding them on to the Internet:

```
ipfwadm -F -a m -S 192.168.0.0/24 -D 0.0.0.0/0
```

The other machines on your LAN should now be able to use the Internet as though they were directly connected to it. Don't forget to configure the DNS server address on each of the machines to whatever your ISP recommends, otherwise you will only be able to access servers on the Internet by their IP address, and not their name.

Most protocols (such as telnet and http) are supported as is with masquerading, but some (such as ftp and irc) require a

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CRT	15"	15"	15"	15"	15"	15"	15"
Dot Pitch (mm)	0.28	0.28	0.28	0.28	0.28	0.28	0.25
1280x1024/1024x768 (Hz)	60/85	NS/60	NS/60	NS/60	NS/60	60/85	65/85
HFreq.(KHz)/VFreq. (Hz)	30-70/50-120	31-48/50-90	30-54/50-120	30-50/50-120	30-66/50-110	30-70/50-120	31-70/50-120
Bandwidth (MHz)	110	65	56	65	NA	80	NA

	CTX 1792UA	LG Electronics Studio Works 7D	Samsung Syncmaster 700s	Hyundai DeluxScan 7870 Dream	AcerView 76ie	Magtron DJ717	Sony 200sf
CRT	17"	17"	17"	17"	17"	17"	17"
Dot Pitch (mm)	0.25	0.28	0.28	0.28	0.28	0.26	0.25
1600x1200 (Hz)	72	NS	NS	NS	NS	65	60
1280x1024/1024x768 (Hz)	85/100	60/75	60/85	60/85	65/85	75/85	75/85
HFreq.(KHz)/VFreq. (Hz)	30-92/50-160	30-65/50-110	30-69/50-160	30-70/50-150	30-69/50-110	30-86/50-160	30-80/50-120
Bandwidth (MHz)	135	110	80	85	NA	135	NA

NS - Not supported

NA - Data not available

*Specifications obtained from the respective manufacturer's Web Page as at 15-10-1997

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The International Standards Organisation is working on a new C standard called C9X in an attempt to make C development just that bit easier. **By Michael Smith**

Developers Corner

Setting the standard

One of the things we all dread is the compiler upgrade. Good, robust software can suddenly degenerate into a mass of bugs. It almost seems that some compiler writers take pleasure in breaking existing code with new upgrades. That's one of the reasons that we have standards.

The International Standards Organisation (ISO) has codified several popular programming languages. A language standard defines the language's behaviour. If you write programs that conform to the standard and compile them with standard compilers, you can have confidence that they will behave in a predictable way.

The C language was first standardised in 1989. Nearly all modern compilers now provide support for the standard, though most also have extensions that are non-standard enhancements. These enhancements can often provide increased functionality, but at the cost of future portability.

The C standard is currently being updated. An ISO committee has been working for some time now on the new standard, which is currently known as C9X, and it has released a working draft of C9X for public discussion and review. In a recent USENET discussion Peter Seebach, a member of the committee, said that the group hoped to release a final version late in 1999.

What's new in C?

Although the release of the final standard is still some time away, you can expect compiler vendors to begin implementing the new features fairly soon based on the draft. With that in mind, let's review a few of the most interesting new features.

- Macros may use *ellipses* to represent variable arguments.

```
#define DBG( ... ) if (debugging) printf(
    __VA_ARGS__ )
```

- C++-style comments are to be supported.

```
x = y + 3; // everything after the slashes is a
comment
```

- New keyword `restrict` to aid compiler optimisation. The `restrict` keyword is a modifier for a pointer. Two `restrict` pointers may not point at the same memory object. For example:

```
void f(int n, int * restrict p, int * restrict q)
{
    while (n-- > 0) *p++ = *q++;
}
void g(void)
{
    extern float d[30];
    f(10, d + 10, d); // ok
    f(10, d + 1, d); // undefined behaviour
}
```

- New keyword `inline` to aid compiler optimisation. This keyword is a modifier for a function. It suggests that where the function is called the compiler should replace the calls with the function code, thus avoiding the overhead of a function call. The compiler is, of course, free to accept or ignore the suggestion as it sees fit.

- A new integer type: `long long`, guaranteed to be at least 64 bits wide. This has both signed and unsigned forms. The introduction of this type is particularly controversial, as it has the potential to break existing code that complies with the 1989 ISO standard (see 'Long longs and compatibility' next page).

- A new floating-point data type: `long double`.

- Three new data types for use with complex numbers:
`float complex`
`double complex`
`long double complex`

- Various maths routines for manipulating

complex numbers. These include complex versions of most of the C maths routines. The complex routines are usually prefixed with a 'c'. For example, `ccos()` is the complex `cos()`; `ccatan()` is the complex `atan()`. There are also some complex-specific routines such as `creal()` and `cimag()` to get the real and imaginary components of a complex number.

- Array declarations may use variable expressions or an asterisk to denote the array size. For example, the following are both valid:

```
int func( int nrows, int ncols, double
a[nrows][ncols] );
int other_func( int a[*] );
```

- In a 'for' loop the first expression may include a declaration, which will have the

Compliance testing

Just because a compiler vendor claims its product complies with the ANSI/ISO standard it's not necessarily true. When someone makes that claim, the first question you ask is what test suite did they use to validate the compiler's compliance?

A test suite is a set of source code that is to be compiled and, in some cases, run. The code is designed to utilise every standard feature, and should contain examples of specific types of errors. A compiler should compile all of the correct code, and the resulting executables should execute correctly. The compiler should also trap all of the errors. If both of these aims are achieved, then the compiler can be said to comply with the standard.

By far the best known test suite for C is the Plum Hall suite. Plum Hall has no affiliation with any compiler vendor, which means that it was able to develop a truly independent suite. See <http://www.plumhall.com/stec.html> for more information.

scope of the loop. For example:

```
for (int i=0; i<10; i++)
    /* do something */
```

is equivalent to:

```
{
    int i=1;
    for ( ; i<10; i++)
        /* do something */
}
```

- You can now selectively initialise array elements or structure members.

```
int arr[10] = { [0]=5, [7]=11 };
struct { int a, b, c } s = { .a=3, .c=5 };
struct { int a, b, c } w[3] = { [0].b=3, [2].a=1
};
```

- Floating-point arithmetic is now required to comply with the IEC559 standard (also known as IEEE 754 and IEEE 854).

- A new identifier `__func__` shows the current function name. `__func__` gives the name of the current function, just as `__FILE__` gives the name of the current file. There is one subtle difference, however. `__FILE__` is defined as a macro and resolved by the preprocessor. `__func__` is defined as a global variable and resolved at run-time. This is because the preprocessor doesn't know about functions.

- Integer division and modulus operators are now defined to round towards zero. It used to depend on implementation whether they rounded towards zero or negative infinity. For example:

```
-22 / 7 = -3    // Truncation towards zero
-22 % 7 = -1
```

```
-22 / 7 = -4    // Truncation towards negative
-22 % 7 = 6     // infinity
```

- The infamous *struct hack* has been legalised:

```
struct s {int n; double d[]};
struct s *p1, *p2
size_t sz
```

```
sz = sizeof (struct s); // sz == offsetof (struct s, d)
```

```
p1 = malloc (sizeof (struct s) + 8 * sizeof
(double));
p2 = malloc (sizeof (struct s) + 5 * sizeof
(double));
```

```
/*
p1 behaves now as if it had been declared as
    struct (int n; double d[8];) *p1;
p2 behaves now as if it had been declared as
    struct (int n; double d[5];) *p2
*/
```

- The `<stdbool.h>` header contains a typedef for `bool` and macros for `true` and `false`.

- The `<inttypes.h>` header gives typedefs specifying integer types with: exactly *n* bits; at least *n* bits; the fastest type containing at least *n* bits, for *n* = 8, 16, 32, 64. These will be useful where the code needs to know something about the size of an integer and will hopefully discourage developers from making assumptions about `int`, `short`, `long` and `long long`.

- A number of new routines to provide access to the floating-point state. These should make it easier to trap and handle various types of floating-point exceptions.

- Some new low-level maths routines such as `isfinite()`, `isnormak()`, `isnan()` and `copysign()`.

- New high-level maths routines such as `gamma()` and `erf()`.

- New `sprintf()` function. This is similar to `sprintf()` except it allows you to specify the length of the destination buffer and will not write past the end of the buffer. A long-overdue addition to the library.

- `vscanf()` family of functions. `scanf()` functions which implement variable arguments, just like `vprintf()` does for the `printf()` family of functions.

- The `<time.h>` header defines a new structure `struct tmx`. This is similar to the existing `struct tm`, but it contains some additional fields for dealing with leap seconds, daylight saving and time zones. There are also some new routines for handling this structure.

- The `<wctype.h>` header defines many wide-character handling functions, including formatted I/O and numeric conversions.

So what's in it for me?

There are a number of important benefits in the new draft standard. The standardised routines for floating-point handling will assist in portability and robustness. Many programmers already handle floating-point exceptions, but they need to use platform-specific code to do it. This should make it easier and encourage more programmers to trap exceptions. The syntax for handling variable size arrays adds a lot of flexibility.

There's nothing revolutionary in this. We won't see the instant abandoning of C++ and Java. However, it's another good step along the way towards good development and robust software. ■

Long longs and compatibility

The introduction of the 'long long' integer type has proven to be one of the most contentious issues of the new C standard. The old standard specifies three integer types: `short`, `int` and `long`. While the standard deliberately avoids associating these types with a particular size, almost all modern compilers use 16-bit shorts and 32-bit longs. A generation of programmers has coded in this environment and all too many have written code which relies on shorts being 16 bits and longs 32. On 16 and 32-bit computers this has proven to work quite well, but as we now move into the world of 64-bit computers the need for a 64-bit integer has become obvious.

We could either: create a new long long type that is larger than a normal long; change the long type to 64 bits on 64-bit computers.

The old standard guaranteed that the long type would be the largest integer. There is existing code that relies on this guarantee and will be broken by option one. There is also code that relies on the 32-bit long and this will be broken by option two.

The economic choice would clearly be the creation of a long long type. This will break far less code. However, whereas the 64-bit long would break code which disobeyed the standard, introducing a long long will break code which obeyed the standard. This has generated much debate among developers.

As the new draft shows, economics has won over aesthetics and the long long will soon be with us, although purists will continue to mutter unpleasantries for some time to come.

JavaScript



bject oriented. These two words, when juxtaposed, mean quicker, faster, newer and better. Other than that, most people don't

know what object oriented programming means. Well, the truth of the matter is that object oriented programming is nothing new — the Smalltalk language has been around for years, and unlike C++, is truly object oriented. So what does that mean?

Earlier columns have introduced variables as named portions of memory, and functions, which are named portions of independent code. Combined with a set of appropriate operators and branching statements, this is enough to build complex and powerful programs. So what does object orientation add to JavaScript? Object oriented programming is simply a method of binding functions and variables together under a unique name.

Objects — an example

The easiest way to learn about objects is by creating one. In this example, we will use an analogy that models a real-life phenomenon to demonstrate objects.

Sometime early this year, I am expecting a baby object. Although I currently have no instantiated baby objects in my life, I know that all baby objects have certain baby methods associated with them. For example, baby objects will always have a cry method, and an eat method as well.

Baby objects also have properties, some of which are known to us, some of which are not. The baby object will have eyes, but we don't know what colour they will be. For the sake of simplicity, let's play God for a

```
function cry()
{
  document.writeln("<p>");
  for(x=0; x<5; x++)
    document.writeln("<br>WAAAAH! ");
}
```

```
function eat()
{
  document.writeln("<p>(slurp, slobber, dribble — generally make a mess of things)");
}
```

moment, and pretend that we can make the baby with any properties we want. I've defined the baby methods in the box, below left.

This is where the JavaScript object model becomes somewhat convoluted. To make a 'class' in JavaScript, you have to define it as a function. In a true object oriented language, a class defines the properties and methods that an object will have, like a blueprint. However, like a blueprint for a car, you can't do anything with the description — you have to make instances of the class (or instantiate it). When you instantiate a car (manufacture it), you then choose the specific properties that the car object has, such as colour, airconditioning, and so on.

For our baby object, we will create four properties: sex, hair, eyes and name. Defining these properties inside the baby class would look like this:

```
function Baby()
{
  this.sex = "Male";
  this.hair = "Brown";
  this.eyes = "Hazel";
  this.name = "Trav Jr";
}
```

Notice that unlike other functions, the Baby() function doesn't seem to do anything. The Baby() function is used to define baby objects — in this case, a baby object has four properties (or variables) associated with it. Every baby object that is created will contain these properties. If we want to make a baby, we simply use the new keyword to create a new baby:

```
var b1 = new Baby();
```

This will create a baby object with a sex property set to 'Male', a hair property set to 'Brown', the eyes property set to 'Hazel', and the name property set to 'Trav Jr'. Notice that in the Baby() function, we used the 'this' keyword. The 'this' keyword is used in JavaScript to refer to the current object. In this example, the current object is the Baby() function, so the variables are bound to the baby function. We can now access the properties of the baby object using the dot (.) operator, as we would with any of JavaScript's properties. For example, if we wanted to alert the user to the b1 object's

Object oriented JavaScript? Yes indeed, read on . . . **By Travis Simon**

```
name, we would use the following code:
alert("B1's name is: " + b1.name);
```

Passing arguments to the constructor

While it is all well and good for a father to hope that the baby looks like him, there is a chance that later you might want a baby with different features. What we need is the ability to create the baby with different attributes. These attributes can be assigned to the baby object from the parameter list, and passed to the baby function through arguments to the new Baby() method. In a true object-oriented language, the function that creates the object is called the constructor function. When an object is created using the new method, it is the constructor function that is called to create the object. Here is an example of a JavaScript constructor:

```
function Baby(babySex, hairColour, eyeColour, babyName)
{
  this.sex = babySex;
  this.hair = hairColour;
  this.eyes = eyeColour;
  this.name = babyName;
}
```

Now we can create as many babies with different attributes as we want. For example, we could create a baby girl named Alex using the following code:

```
var b2 = new Baby("Female", "Blonde", "Brown", "Alex");
```

Adding methods to objects

Now that we've added our own characteristics to the babies, we need to make sure that they can do all the things that they're supposed to do, such as cry and eat. These methods can be added in the same manner as the properties:

```
function Baby(babySex, hairColour, eyeColour)
{
  this.sex = sex;
  this.hair = hairColour;
  this.eyes = eyeColour;
```


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```
this.cry = cry;
this.eat = eat;
}
```

Notice that the baby function defines baby objects, but does nothing on its own. The baby function just defines the properties and methods that baby objects will have. If we want to make a baby cry (wah ha ha!), we need to instantiate a new baby object, and then make the instantiated baby object cry:

```
var b3 = new Baby("Male", "Brown",
  "Brown", "Ned");
b3.cry();
```

Objects as properties of other objects

Finally, you can create objects that contain other objects. For example, to extend the previous example, we will assume that we have defined mother and father objects like we defined the baby object. We could then create a family object that would group together the mother, father and baby objects. The function would look like this:

```
function Family(mother, father, baby)
{
  this.mum = mother;
  this.dad = father;
  this.baby = baby;
}
```

If we had a father object called Travis, a mother object called Kathryn and a baby object called Alex, we could create a family object using the following code:

```
var SimonFamily = new Family(Kathryn,
  Travis, Alex);
```

We can then access the methods and properties of the objects using the dot notation. If we wanted to make the baby object eat, we could use the following syntax:

```
SimonFamily.baby.eat();
```

Similarly, if we wanted to make another baby cry, we would use the syntax:

```
WhiteFamily.baby.cry();
```

Using objects

So far in this article, we have seen an abstract example of how to create objects, but little discussion has been devoted to why objects would be desirable to use. Quite simply, objects organise information in a manner that is easy to use. In sit-

uations where you have large amounts of similar information that need to be made available to users, objects can help manage that data.

Let's look at an example that is more applicable to a real-life situation. Over the past two years, there has been a great deal of change and expansion at APC. With this growth, there has also been a restructuring of responsibilities, and it is sometimes difficult for readers to know who the appropriate person is to contact here. Further, there is no easy way of tracking down the information (OK, so it's printed in the magazine, but who reads that page anyway?). One possible solution might be to create a Web page with each staff member's contact details on it.

For the contact page to be usable, it would have to be current, which means that it would have to be easy to maintain. Further, it should be flexible, so that information could be easily added and deleted as necessary. Finally, we would want the page to be useful.

To begin working on this project, I separated the necessary data into separate groups (objects). The information is going to be presented on a form, which the JavaScript language has already defined. The second most obvious object is an employee object, which contains information on each individual employee. Finally, all the employees have to be grouped together so they can be worked on as a whole.

The next step is to plan the employee object, and decide what information it needs to contain. This example is fairly straightforward — we need to track the employee's name, area of primary responsibility, phone number and email address. It would also be nice if each employee object had a showPerson() method that displayed the appropriate information on the form. The employee object could be defined by the following code:

```
function empl(employeeName)
{
  this.name = employeeName;
  this.area = "";
  this.phone = "";
  this.email = "";
  this.showPerson = showPerson;
}
```

The method's name is empl(), and not employee(), as would be expected. I chose empl because all of the empl objects are going to be collected in an array named

employee. Since most of the code will be operating on the array of objects, and not the objects themselves, it makes more sense to be able to use the following syntax:

```
alert("Employee's email address: " +
  employee[0].email);
```

Finally, each empl object has to be instantiated. For example, Lachlan's object can be defined like this:

```
var lbott = new empl("Botticchio, Lachlan");
lbott.area = "Technical Editor";
lbott.phone = "(02) 9288 9199";
lbott.email = "lb@acp.com.au";
```

The benefit of this approach is that it is easy to maintain. The objects make it easy to adjust to restructuring, and new information can easily be added. The full implementation of this example can be found in this month's examples on **apc-mag.com**.

A final word on objects

With JavaScript objects, the goal is to separate the design and use of your objects. For example, when you use the writeln() method, the important thing is that the text gets printed to the screen, not *how* it gets printed to the screen.

When designing objects, it is often easier to concentrate on how you want to use the object, and not how you need to model the data. For example, if you were creating a technical Web site with many terms, you might want a 'reference' object that contained methods related to reference material. Instead of concentrating on the data, it is easier to concentrate on what you need to do with the object, such as:

```
reference.find("ASDL");
```

or

```
reference.items[36].show();
```

The methods presented above may or may not be how you would prefer to work with the reference object, which is why it is important to imagine using the object before implementing it in code.

Travis Simon can be reached via email at **trav@acp.com.au**.

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The Gathering Place

The bare necessities of HTML. By Lee Borkman

HyperText

As I wrote last month, there is a huge amount of fluff and distraction with which the aspiring Web developer is confronted. In that article, I tried to sort out just what you really need to know and just what you can afford to leave for another day. And the conclusion? What you need to know is HTML. What you can leave is just about everything else — but I can be even more specific.

You don't really need to know everything about HTML, not at first anyway. To create spanking good Web pages you just need to get acquainted, well acquainted, with a handful of basic tags. I tried to narrow down the basic set to 10 tags, but I couldn't really do better than 15. Here, then, is a streamlined guide to HTML authoring — guaranteed all meat, no fat.

HTML — What is it?

HTML is the Hypertext Markup Language. It's used to 'mark up' text, define the different sections of a document, and to create meaningful links from document to document. You can also use HTML to specify the basic layout of your document.

Web browser software like Netscape's Navigator or Microsoft's Internet Explorer will read the HTML as input and render it as a formatted document for the world to see.

HTML is not a very precise or efficient means of creating stunning documents, and its continuing evolution is chaotic, but with just a little understanding the results can be surprisingly good.

The top tags

HTML markup consists of plain text interspersed with 'tags' which are not displayed in the final document, but do affect the appearance and behaviour of the document. HTML tags are enclosed within angle brackets (for example, <TABLE>). Many tags also have a corresponding 'closing tag' (for example, </TABLE>). Let's take a look at some of the 15 essential HTML tags, and how to use them.

<HTML>, <HEAD>, <TITLE> and <BODY>

These are the minimum tags necessary to

create a well-formed HTML document. A basic document looks like this:

```
<HTML>
<HEAD>
<TITLE>Simple Page</TITLE>
</HEAD>
<BODY>
This is a very simple page.
</BODY>
</HTML>
```

You can see that the <HTML></HTML> tags enclose the entire document. The document is then divided into two parts, head and body. Within the head of the document the title is defined. The title will appear at the top of the browser window when the document is displayed. The document head is also the best place to include JavaScript or VBScript definitions and META information. These are luxuries, however, so we won't worry about them in this workshop.

The body of the document (the part that actually gets displayed) is enclosed within the <BODY></BODY> tags. The <BODY> tag can also include some useful 'attributes' which affect the way in which the document is displayed. Here are a couple of examples:

```
<BODY BGCOLOR="#FF0000"
TEXT="#000099">
<BODY BACKGROUND="tile.gif"
LINK="#009900">
```

These are the <BODY> tag's attributes:

- **BGCOLOR** This defines a background colour for the displayed document (note the US spelling). This is usually specified as a hexadecimal triplet which defines the red, green and blue components of the colour. In the first example above the background colour is #FF0000, or pure red.
- **BACKGROUND** This attribute defines an image which will be tiled and used as the background for the document. The address of the image file can be given relative to the current document (as in the second example), or can be specified as a complete URL (Universal Resource Locator) in the form http://server/path/filename. Be careful when using background images — smooth tiling is difficult unless you use an image that is only one or two pixels high (or wide).

● **TEXT, LINK, VLINK and ALINK** These attributes define the colours for plain text, hypertext links, visited links, and active links. The syntax is similar to that of the BGCOLOR attribute. In the first example above the background is bright red, and the text is dark blue.

The two major elements of a standard Web page are text and graphics. The tag gives you a reasonable amount of control over the look of the text. Here is an example:

```
<FONTFACE="arial, helvetica" SIZE=1>This
is some text.</FONT>
```

The tag has three important attributes:

- **FACE** This defines which typeface will be used to display the text. The attribute takes for its value a list of font names. When the browser displays this text, it will search the system for the first font on the list, then the second, and so on, and display the text using the first matching font face. If there is no match, or if the FACE attribute is not specified, then the browser will use some default font, usually Times New Roman. You should go out of your way to avoid Times New Roman as it has become far too common. The above example specifies two very useful font faces, Arial and Helvetica. These are virtually identical sans serif faces that will be found on almost all systems — PC, Mac and Unix.
- **SIZE** This specifies the size of the displayed text, and can be any integer from 1 to 7. The attribute can also be given as a relative value (like -1 or +3). Note that the displayed size is relative to the document's default (or BASEFONT) size — the relative values do not compound.
- **COLOR** For headings and other text that needs emphasis you can define the text colour. The syntax is the same as that of BGCOLOR (see above). Use this attribute sparingly.
- ** and <I>** For simple emphasis make your text bold () and/or italic (<I></I>). These 'physical' tags have proven much more popular than their 'logical' equivalents, and . There is also a <U> tag for underlining, but this

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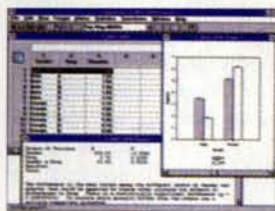


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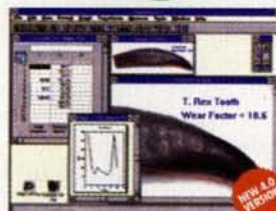
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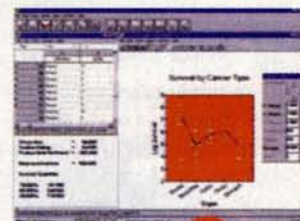


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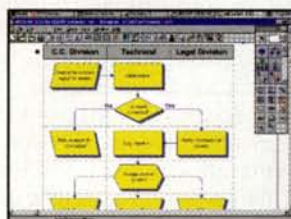


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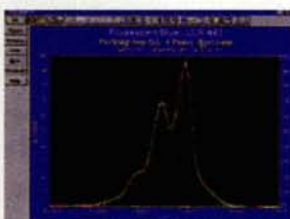
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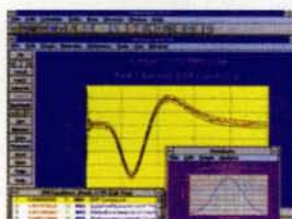
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should probably be avoided, as hyperlinks are usually displayed as underlined.

 and <P>

Although HTML does not yet have any well-supported means of defining line spacing, you get some minimal control using the
 and <P> tags.
 forces a single line break, while <P> (paragraph) usually causes a line break and a single blank line. <P> takes an optional closing tag and can also be modified with a single attribute, ALIGN. The value of ALIGN can be LEFT (the default), RIGHT, or CENTER (note the spelling again).

After text, the major component of your pages will probably be images. These are specified using the tag. The popular browsers support two different image formats, GIF and JPEG. Here is an example:

```
<IMG SRC="http://apcmag.com/images/picture.jpg" HEIGHT=20 WIDTH=40 ALT="A Sample Picture" VSPACE=2 HSPACE=2>
```

● **SRC** The SRC attribute is required and specifies the location of the image file. Like the <BODY> tag's BACKGROUND attribute, SRC can take an absolute URL or a relative location as its value.

● **LOWSRC** This attribute specifies an alternative image which will be loaded and displayed before the main SRC image. The intention is that the LOWSRC image should be a low-resolution, low-bandwidth version of the main image but you can actually use any image you wish. The LOWSRC image will be stretched to fit the same area as the SRC image.

● **HEIGHT** and **WIDTH** You can choose to specify the HEIGHT and WIDTH of the image to be displayed. The values can be

given in pixels or as a percentage of the available screen real estate. Note that a WIDTH of 50% does not mean that the image should be displayed at half size. If only one of these attributes is defined, then the image will be displayed with its aspect ratio intact. If neither HEIGHT nor WIDTH is specified, then the image will be displayed at its full size. It is, however, very good practice to always specify both attributes. If you do this, the browser will know how much space to set aside for the image so it can start to display content without delay.

● **VSPACE** and **HSPACE** These two attributes define the vertical and horizontal space that will be inserted between the image and any surrounding content. The value is given in pixels. If the attributes are not specified, then no space will be inserted.

● **ALT** The ALT attribute defines the alternative text that will be displayed while the image is loading, or when using a text-only browser. Providing sensible ALT text is very good form, and will even allow your document to be accessible to the blind via speech-synthesis systems.

<A>

We have room for just one more tag, but it's a good one. The <A> tag is used to define hyperlinks. Any image or piece of text can be linked to any other document on the same Web, or to a defined location (anchor) within a document. Here are a few examples:

```
<A HREF="http://apcmag.com">Click here to go APC's home.</A>
```

```
<A HREF="test.htm"><IMG SRC="picture.gif" BORDER=0></A>
```

```
<A NAME="Middle">This is the middle of the page.</A>
```

```
<A HREF="#Middle">Click here to go to the middle.</A>
```

● **NAME** This makes the enclosed content a named anchor. This part of the document can now be specifically referenced by a hyperlink, which is very useful for long documents which need a table of contents for navigation.

● **HREF** This specifies the location of the linked document. As usual, you can use an absolute URL or a relative location. The location can include a reference to an anchor (as in the fourth example above). A '#' is used to specify an anchor within the document (for example, HREF="http://apcmag.com/test.html#bottom").

● **TARGET** When a hyperlink is clicked, the page in the current browser window is normally replaced by the new page. The TARGET attribute allows you to specify that the new page should load in a different window. This attribute will be particularly important when we discuss the more advanced topic of frames.

Well, we have covered quite a bit of territory. We have seen the tags that define the basic structure of an HTML document and more tags for controlling text and images. Most importantly, we have seen how tags can define hyperlinks between documents, and that is really the one thing that has made the World Wide Web such a runaway success.

Sadly, we will have to wait until next month to look at the last few essential tags. In particular, we will look at tables, which are the key to getting all of your text and graphics to appear just where you want them. For the more adventurous, we will also look at frames and forms, which should be enough for almost any Web design challenge.

For now, you should have plenty of food for thought. If you really get to know these tags inside out, then you are well on your way to Web superstardom. ■

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Each month this page lists all the Shareware files to be found on **apcmag.cd**. Simply browse to the Workshop section to find the files and related reviews.

Shareware summary

Windows 95

Digital Challenge

Useful testing/training program for basic topics in digital electronics, including binary counting, logic gates and the operation of the 555 timer IC. DOS program, works well under Windows.

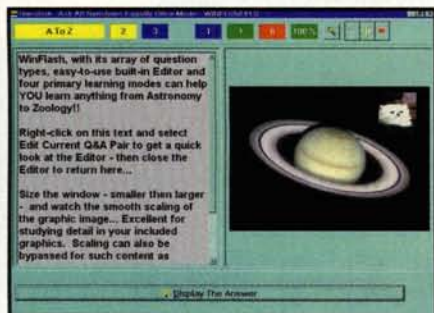
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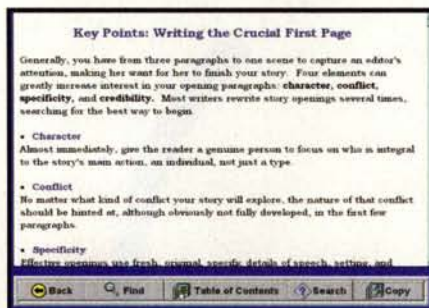
The Writer's Software Companion Demo

Demonstration of an excellent tutorial package for intending or practising fiction writers. Provides functioning module on writing beginnings, middles and endings.



WinFlash32 5.0

Very versatile program for creating and using flashcards as a teaching aid. Includes support for multimedia content.



Chemlab 1.2a

Simulator for conducting experiments in inorganic chemistry, suitable for senior high school or early tertiary studies. Saves on time and glassware.

Pick of the Month

Ziff-Davis Archive

For a good selection of the best of shareware for all flavours of Windows, check out the library maintained by US publisher Ziff-Davis at <http://www6.zdnet.com>. It is extremely well equipped with search facilities, reviews and ratings.

OS/2

Clone-Cleaner 2.30

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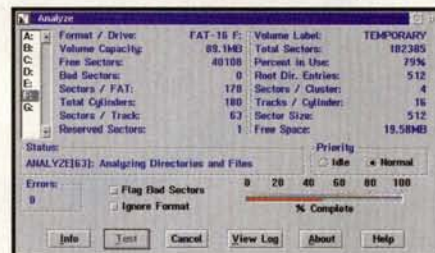


McAfee VirusScan for OS/2 3.1.2

Everyone needs a virus scanning/cleaning utility, whether they access the Internet or not. Although there are many popular and pretty scanners and cleaners out there, I have not found one with the functionality, strength and size of good old McAfee OS2Scan.

GammaTech Utilities for OS/2 3.0

Although the demonstration version of GammaTech Utilities for OS/2 contains only an analyse function, this is but one of the 25 in the complete edition. GammaTech Utilities is more of a suite of programs, much like the famous Norton



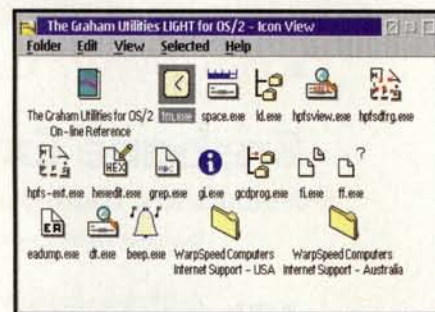
Utilities, a collection of programs that carry out several different functions.

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Provides 2 USB ports with a bandwidth up to 12Mb/s. Supports real time dynamic insertion and removal of up to 127 devices.



Cat. No. 2622 **Two Port USB Card PCI** \$99

Cat. No. 9093 **Universal Serial Bus Cable** \$12.95

Ultra High Speed Serial Card

Break the barrier with this two port card featuring 16650 UART chips with 32 byte FIFO buffers. It provides interrupts 3, 4, 5, 7, 9, 10, 11, 12 & 15 as well as being configurable as COM 1,2, 3, 4, 5, 6, 7 or 8.

Cat. No. 2333 **Two Port 16650 Serial Card** \$159

Cat. No. 2239 **Two Port 16550 Serial Card** \$99

Bi-directional & ECP/EPP Printer Cards



Bi-directional parallel ports with an 83 byte FIFO buffer, configurable from LPT1 to LPT6 and set on interrupts 3 to 15. Achieve data transfer

rates up to 1Mb/sec with ECP/EPP. Both ports provide 7 selectable I/O port addresses and 10 selectable IRQ's as well as two selectable DMA channels

Cat. No. 2314 **Bi-directional 1 Port** \$45

Cat. No. 2315 **Bi-directional 2 Port** \$61

Cat. No. 2316 **Bi-directional 3 Port** \$97

Cat. No. 2235 **ECP/EPP 1 Port** \$79

Cat. No. 2236 **ECP/EPP 2 Port** \$94

Ethernet Hub Card 5 Port UTP

Mounts on the backplane of a computer but does not plug into a slot, it only connects to the power supply. No separate case & power supply means reduced costs, plus everything is neat & tidy.



Cat. No. 11287 **Ethernet Hub Card 5 Port UTP** \$99

CPU Voltage Checker



Avoid CPU burnout! Make sure you have the motherboard jumpers set correctly. This unit checks and displays the voltage on the CPU socket before the CPU is inserted. Ideal for those

who upgrade systems, install motherboards, sell processors, build systems, service and repair or for educators and schools.

Cat. No. 3365 **CPU Voltage Checker** \$99

Dual Exhaust Fans



Two products to keep your computer and your hard drive cool! Dissipate heat with dual exhaust fans attached to a plenum to exhaust hot air from inside the computer. Reduce the possibility of data loss due to your hard drive overheating with dual fans attached to a ventilated face plate. It will effectively dissipate heat from the HDD & significantly lower the internal temperatures.

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Cat. No. 8420 **Dual Exhaust Fans** \$45

PCI Network Cards

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Cat. No. 11271 **Ethernet PCI** \$69

Cat. No. 11282 **Ethernet PCI 10/100Mbps** \$99

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Cat. No. 8387 **RS422 DB15** \$59

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Cat. No. 8388 **10BaseT RJ45 1 Port** \$59

ZipShot Video Capture

We were amazed at the photographic like picture quality achieved with ZipShot. ZipShot connects to a parallel port, (with parallel pass-through), and allows a video camera to be connected via composite video or s-video. It supports PAL, NTSC and SECAM straight out of the box. Zipshot will capture a sequence of frames and let you select the one you want. It will also capture AVI files and is bundled with an incredible range of software.

Cat. No. 3364 **Zipshot** \$329

Multi-Network Cable Tester Pro

This Plug and Play advanced design cable tester will test both 10Base-T (Category 3-5) and 10Base-2 (Coax) cable within seconds. It runs all tests automatically and LED's indicate the results. It will test cable continuity, open pairs, shorted pairs, crossed pairs or reversed pairs.

Cat. No. 11515 **Multi-Network Cable Tester Pro** \$259

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Pick of the month

Stardock Software

Stardock is one of the software companies that continually pumps out high-quality OS/2 software. If you've never been to its site to see what's on offer, check it out at <http://www.stardock.com/>.

Mac

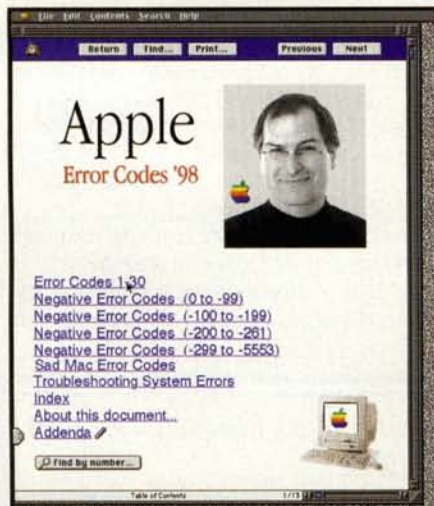
Lush

Lush is a bartender's guide that contains over 100 easily located recipes and a clever database search that locates the drinks that can be created using available ingredients. Essential for unexpected parties.



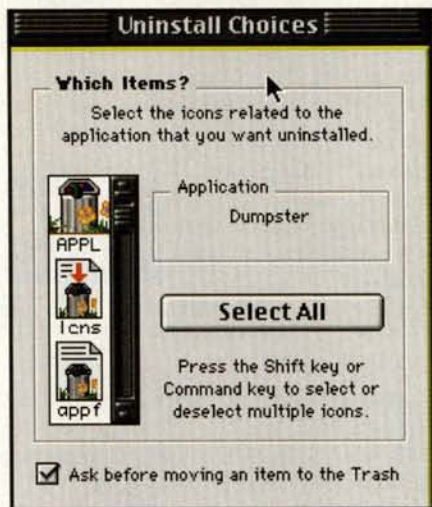
Apple Error Codes 98

A document with translations for hundreds of Macintosh error messages. Includes all the common and not-so-common error codes including the mysterious Type 11.



Yank

Yank uninstalls unwanted applications, completely.



Keep Out

Keep Out is a start-up password protection device for Mac OS. It works by replacing the file which the startup makes its Finder call on with a Keep Out! file, and hiding the original.

Pick of the month

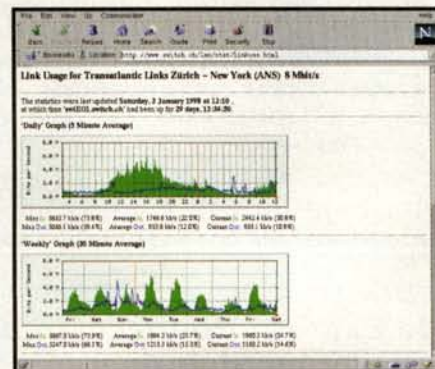
Mac Internet helpers

Check out <http://www.tiac.net/users/mdw/machelp.html> for a comprehensive collection of Internet-centric Mac software.

Linux

CMU-SMNP

SNMP (Simple Network Management Protocol) is a common, standardised protocol which provides a basis for managing networks via IP, and should be of interest to network administrators and users wishing to learn more about network management.



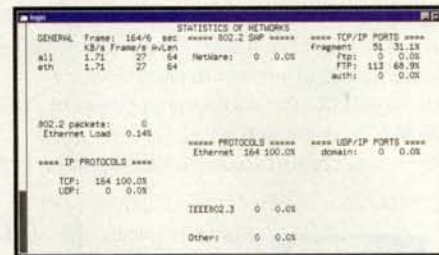
Scotty

Scotty is a flexible, freely available network management system offering a

powerful alternative to expensive commercial software.

MRTG

MRTG, the Multi Router Traffic Grapher, is a sophisticated network statistics monitoring tool which produces graphical output for display via the Web.



Big Brother

Big Brother watches systems via a set of simple scripts and summarises their status in an HTML table.

Statnet

Statnet is a simple, terminal-based network statistics tool developed specifically for Linux. Information displayed includes data transfer rates, frame rates and load figures for Ethernet, SLIP and PPP interfaces.



Pick of the Month

Linux User Groups Worldwide

The Linux User Groups Worldwide site (<http://www.nlug.nl/lugww/>) provides listings of Linux user groups, with details for approximately 170 groups in 40 countries. The Australian listing currently includes seven user groups across ACT, NSW, Qld, SA and Vic, putting Australia near the top in terms of the total number of user groups for any country. A great resource for tracking down Linux user groups near your location, or for notifying the world if you decide to start your own.

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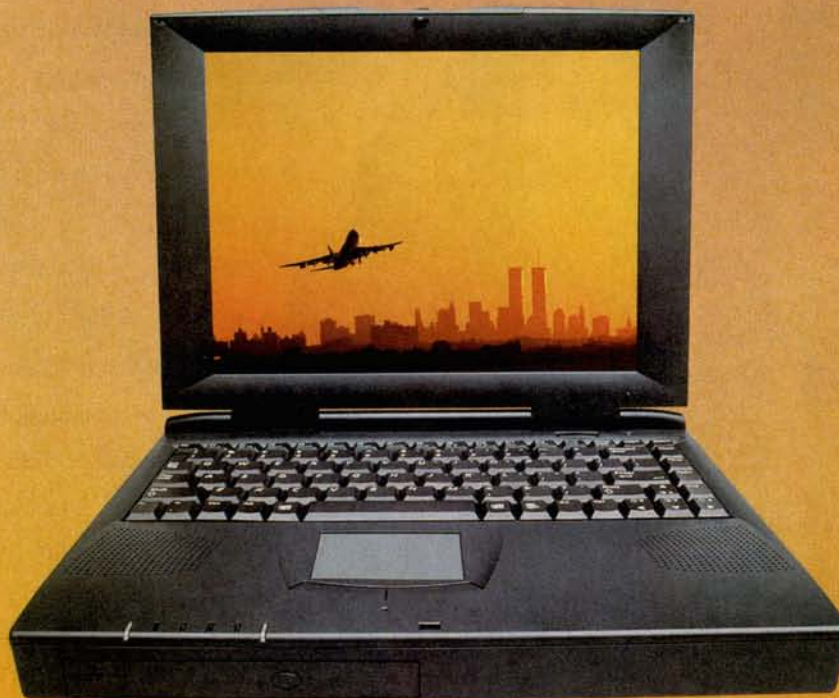
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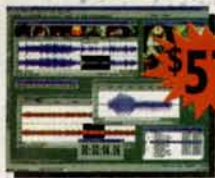


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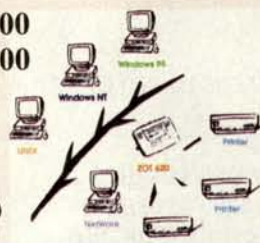


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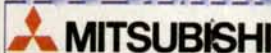


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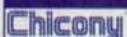
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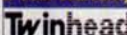
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Videocom's Monitor Designed For The Australia And New Zealand Regions. The On Screen Display Function Enhances True Color, Excellent Corner To Corner Focus And High Resolution Pictures.



Designed for
Microsoft
Windows 95



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17"
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Videocom

Adelong Direct



March 1998

ADE Vantage Value

For details see page 4.



\$1195



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further

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ADE Advantage P233 MMX

For details see page 5

"Loaded with all the components you'd expect to find in a consumer PC, as well as an impressive 3-year insured warranty covering parts and labour ... it sat near the top of our most demanding test"

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December 1997
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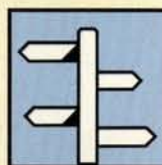
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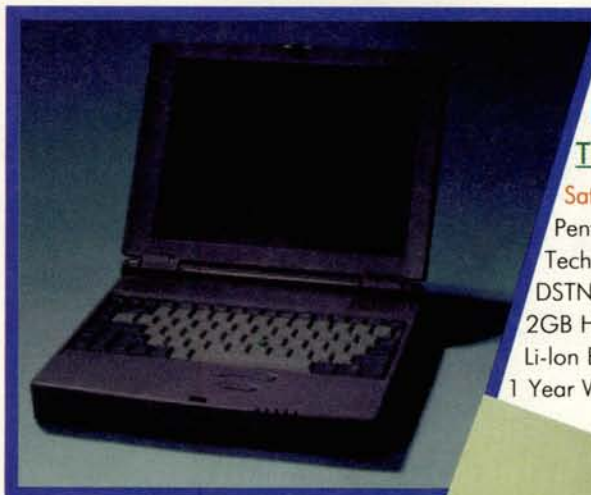


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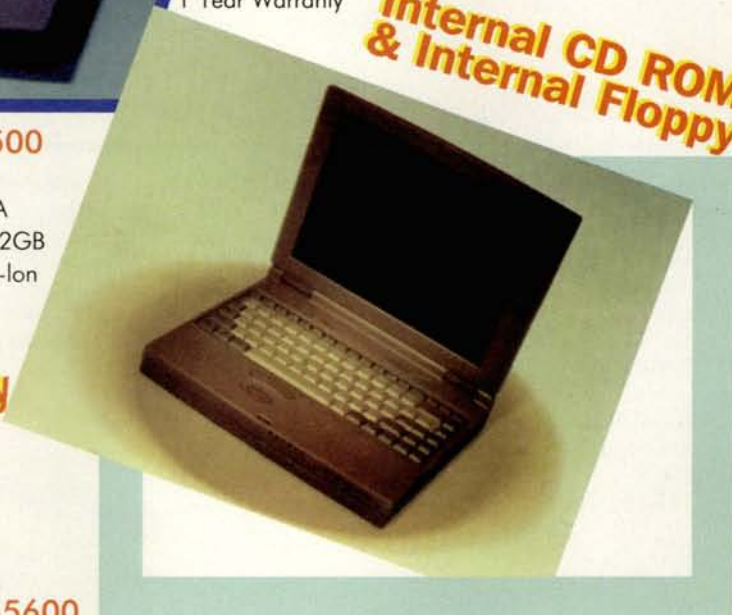
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ADE ATX Case
Windows 95

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4MB Diamond Viper AGP Graphics Card
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17" Colour Monitor
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Jazz 300W 3D Speakers
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Jazz 300W 3D Speakers
4MB Diamond Viper AGP Graphics Card
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ADE ATX Case
MS Windows 95

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Adaptec 2940 Ultra Wide SCSI Card
4GB Ultra SCSI Hard Drive
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2MB PCI Graphics Card
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MS Intellimouse and pad
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486 DX4-100
Pentium 166 MMX
IBM M2-166
Pentium 200 MMX
Pentium 233 MMX
AMD K6 166
IBM M2-200
AMD K6 200
AMD K6 233
Pentium II 233
Pentium II 266
Pentium II 300

CPU32



pentium®

Voltage:	2.8v, 3.3v	
Code	Model	Price
CPINT005	Pentium 166MMX	\$225
CPINT006	Pentium 200MMX	\$325
CPINT012	Pentium 233MMX	\$450
CPINT009	Pentium II 233	\$595
CPINT010	Pentium II 266	\$845
CPINT011	Pentium II 300	\$1195
CPINT013	Pentium II 333	\$1550



Voltage:	2.9v, 3.3v, (K6-233 2.9v, 3.2v)	
Code	Model	Price
CPAMD005	AMD K6-166	\$275
CPAMD003	AMD K6-200	\$330
CPAMD004	AMD K6-233	\$455



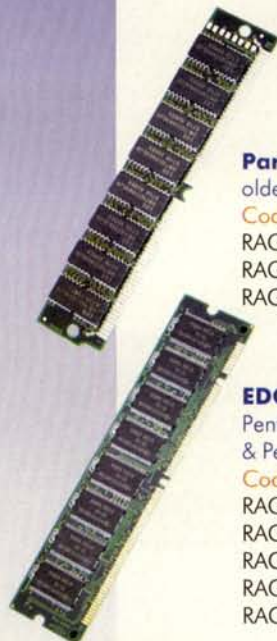
Voltage:	2.9v, 3.3v	
Code	Model	Price
CPIBM004	M2-166MHZ	\$125
CPIBM005	M2-200MHZ	\$195



486 DX4-100
AMD K6 166
Pentium 166 MMX
IBM M2-166
AMD K6 200
Pentium 200 MMX
IBM M2-200
Pentium 233 MMX
AMD K6 233
Pentium II 233
Pentium II 266
Pentium II 300

CPU16

Memory



Parity RAM - This error checking ram is used with older desktop systems and servers.

Code	Model	Price
RAGEN011	4MB SIMM 72 Pin	\$75
RAGEN012	8MB SIMM 72 Pin	\$99
RAGEN013	16MB SIMM 72 Pin	\$145

EDO RAM - For use in newer 486 systems and most Pentium / Pentium Pro style systems. Used in pairs in Pentiums & Pentium Pro's.

Code	Model	Price
RAGEN004	8MB EDO SIMM 72 Pin	\$35
RAGEN005	16MB EDO SIMM 72 Pin	\$59
RAGEN006	32MB EDO SIMM 72 Pin	\$120
RAGEN019	64MB EDO SIMM 72 Pin	\$Call
RAGEN020	128MB EDO SIMM 72 Pin	\$Call

Fast Page RAM - For use in older 486 & Pentium systems and some printers. Use in pairs in Pentiums.

Code	Model	Price
RAGEN000	4MB SIMM 72 Pin	\$35
RAGEN001	8MB SIMM 72 Pin	\$45
RAGEN002	16MB SIMM 72 Pin	\$75
RAGEN003	32MB SIMM 72 Pin	\$145

SDRAM - For use in current Pentium / Pentium II systems utilizing Intel TX / LX Chipsets. Use individually.

Code	Model	Price
RAGEN007	16MB SDRAM 168 Pin	\$95
RAGEN008	32MB SDRAM 168 Pin	\$129
RAGEN009	64MB SDRAM 168 Pin	\$295
RAGEN021	128MB SDRAM 168 Pin	\$Call



® Mainboards



DTK Pentium TX High Performance Mainboard PAM-00571

PAM-00571 AT Pentium PCI/ISA. Intel 82430TX

Chipset High Performance Mainboard

1. CPU/System Temperature Monitoring
2. Switching Voltage Regulator Support
3. Four 32-bit Master PCI
4. Four 16-bit ISA
5. On board supports two USB ports for USB devices

System Processor

Intel Pentium, MMX series, Cyrix 6x86, M2 series and AMD K5, K6 series, up to 233MHz

Pipeline Burst Mode SRAM size 512Kb

Main Memory

1. Four 72-pin SIMM Socket, support both FP Mode DRAM Modules configuration up to 256Mb
2. Two 168-pin DIMM Socket, support 3.3V SDRAM configuration up to 256MB

Intel 82430TX PCIset

Bios System

1. Award/AMI
2. Supports Flash ROM BIOS
3. Supports Plug "n" Play

Multi I/O

1. On board Multi I/O supports two serial, one parallel port and floppy drive controller
2. Serial Ports are 16550 Fast UART compatible
3. Parallel port has EPP and ECP capabilities
1. Four 32-bit Master PCI
2. Four 16-bit ISA

PCI IDE

1. PCI Master IDE controller supports PIO Mode 3 and 4 devices, I/O data transfer rate can be up to 17Mb/s
2. Supports Ultra DMA33



MBDTK002

\$169



DTK Pentium II LX Mainboard PRM-00761

PRM-00761 PCI/ISA Single Processor ATX Format

Intel 82440LX High Performance Mainboard

1. CPU/System Temperature Monitoring
2. Switching Voltage Regulator Support
3. Four 32-bit Master/Slave PCI
4. Three 16-bit ISA
5. One 64-bit AGP(66MHz)
6. On board supports two USB ports for USB devices

System Processor

Intel Pentium II series, up to 333MHz

Main Memory

1. Four DIMM Sockets, memory configurations up to 512Mb
2. Supports both Synchronous DRAM and EDO Mode Modules
3. ECC Function ensures data correction and integrity

Intel 82440LX PCI set

Bios System

1. Award / AMI
2. Supports Flash ROM BIOS

3. Supports Plug "n" Play

Multi I/O

1. On board Multi I/O supports two serial, one parallel port and floppy drive controller
2. Serial ports are 16550 Fast UART compatible
3. Parallel Port has EPP and ECP capabilities
4. Irda Allows serial communication at baud rates of up to 4Mbps

1. Four 32-bit Master/Slave PCI

2. Three 16-bit ISA

3. One 64-bit AGP(66MHz)

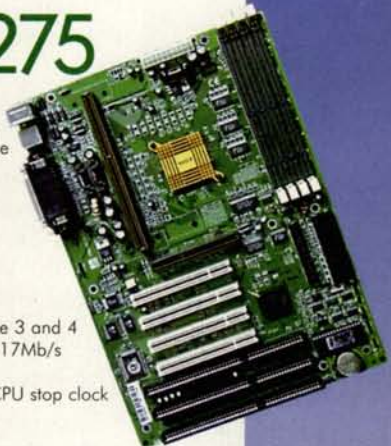
PCI IDE

1. PCI Master IDE controller supports PIO Mode 3 and 4 devices, I/O data transfer rate can be up to 17Mb/s
 2. Support Ultra DMA33
- True green functions, Support SMM, SMI and CPU stop clock functions



MBDTK005

\$275



DTK Dual Pentium II LX High Performance Mainboard PAM-00771

PRM-00771E PCI/ISA Dual Processor ATX Format

Intel 82440LX High Performance Mainboard

Dual Intel Pentium II series, up to 333MHz

1. CPU/System Temperature Monitoring
2. Switching Voltage Regulator Support
3. Four 32-bit Master/Slave PCI
4. Three 16-bit ISA
5. One 64-bit AGP (66MHz)
6. On board supports two USB ports for USB devices

Main Memory

1. Four DIMM Sockets, Memory configurations up to 512Mb
2. Supports both Synchronous DRAM and EDO Mode DRAM Modules
3. ECC Function ensure data correction and integrity

Intel 82440LX PCIset

Bios System

1. Award/AMI
2. Supports Flash ROM BIOS

On Board UltraWide SCSI Controller

3. Supports Plug "n" Play

Multi I/O

1. On board Multi I/O supports two serial, one parallel port and floppy drive controller
2. Serial Ports are 16550 Fast UART compatible
3. Parallel port has EPP and ECP capabilities
4. Irda allows serial communication at baud rates up to 4Mbps

PCI IDE

1. PCI Master IDE controller supports PIO Mode 3 and 4 devices, I/O data transfer rate can be up to 17Mb/s
 2. Supports Ultra DMA33
 3. Adaptec 7880 Wide Ultra SCSI
- True green functions, Support SMM, SMI and CPU stop clock functions



MBDTK006

\$545



DTK Pentium Pro AT High Performance Mainboard PRM-00311

1. CPU Intel Pentium Pro series up to 200MHz.

2. Chipset Intel 82440FX PCIset.

3. Architecture PCI Master IDE controller supports PIO Mode 3 & 4 devices, I/O data transfer rate up to 22Mb/s. 5x32 bit Master/Slave PCI & 3x16 bit ISA slots.

4. System Memory 6x72 pin SIMM Modules, memory config. up to 384Mb supports both FPM and EDO mode DRAM.

5. System BIOS Award/AMI, supports flash ROM BIOS, Green Features.

6. Board AT Form.



MBDTK000

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Diamond Fire GL 1000 Pro 8MB

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FirePort 40

• Ultrawide SCSI
\$365 CCDIA001

FirePort 40 Dual

• Dual Ultrawide Channels
\$575 CCDIA002



Video Cards



GENERAL

Code	Model	Price
DC GEN000	1 MB ISA SVGA card	\$49
DC GEN001	1 MB S3 PCI SVGA card (upgradeable to 2Mb)	\$55
DC GEN003	1Mb EDO upgrade for S3	\$25

matrox

Code	Model	Price
DCMAT002	2MB Matrox Millenium	\$195
DCMAT003	4MB Matrox Millenium	\$295
DCMAT016	4MB Matrox Mystique 220	\$245
DCMAT013	4MB Matrox Millenium II	\$375
DCMAT014	8MB Matrox Millenium II	\$635
DCMAT019	Matrox M3D	\$225
DCMAT017	4MB For Millenium II	\$275
DCMAT014	8MB For Millenium II	\$445

UPGRADES FOR PREVIOUS MATROX CARDS

DCMAT005	2MB RAM For 2MB Millenium Card	\$145
DCMAT006	4MB RAM For 4MB Millenium Card	\$245
DCMAT007	6MB RAM For 2MB Millenium Card	\$315
DCMAT009	2MB RAM For Mystique Card	\$95
DCMAT010	4MB RAM For Mystique Card	\$175

miro

Miro PCTV Pro	MMMIRO00	\$355
Miro DC10 PCI Media Studio 2.5	MMMIRO01	\$675
Miro DC20 plus Media Studio 5	MMMIRO04	\$1150
Miro DC30 plus	MMMIRO02	\$1995

Still one of the fastest graphics accelerators around, the Matrox Millenium II is the ideal choice for graphics professionals. Coupled with the new Power VR driven M3D card, you will also get blistering 3D performance.

The Matrox Millenium II can be configured with up to 16Mb of Wram, the fast ramdac and extensive drivers will provide fast stable graphics performance for all applications.



Mainboard

ADE 586TX PCI-Pentium Mainboard

System Memory

2 x 168pin 72bit DIMM modules
2 x 72pin SIMM modules
Supports both FPM & EDO mode DRAM

PCI IDE

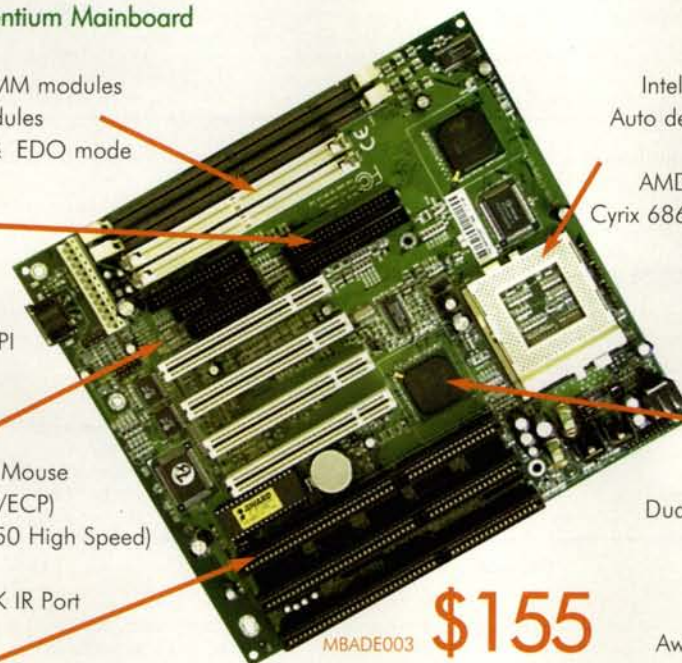
2 x PCI Bus Master
IDE ports
PIO Mode 3, 4,
UDMA33 IDE & ATAPI
CD-ROM

I/O Interface

1 x Floppy port
AT Keyboard & PS/2 Mouse
1 x Parallel port (EPP/ECP)
2 x Serial ports (16550 High Speed)
2 x USB sorts
115.2 Kbps IrDA/ASK IR Port

Expansion Slots

4 x PCI 32 bit
3 x ISA 16 bit



Processor

Intel Pentium series up to 233 Mhz
Auto detect & setup Intel P54C, P55C
processor (MMX)
AMD K5 and K6 (MMX) Processors
Cyrix 686 (M1) & M2 (MMX) Processors

Cache RAM

512KB PB SRAM

Board Size

22 x 24cm

AT Form

Chipset

Intel 82430TX

CPU Power

Dual Switching Voltage Regulators

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MBADE003

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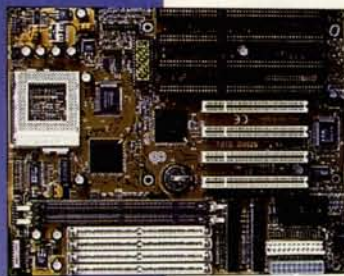
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In a continuing campaign to give its customers more and more value for their money, CHAINTECH is bundling a total virus protection solution with their mainboards, absolutely free of charge.

The 100% virus protection solution consists of a unique bootsector protection program which is built-in to the mainboard's BIOS, called ChipAway Virus, and the award winning PC-Cillin v3.0 (OEM version) virus protection program.

Chaintech's 5TDM2 has been chosen the 'Testwinner' in a test conducted by Germany's most popular and influential magazine, PC Magazine.



System Processor: Supports up to 233MHz Pentium® processors, Cyrix/IBM 6x86 (processor rev.2.7 or later) and 6x86L PR120+~PR166+ and 6x86MX PR166-PR233+ processors, AMD KS PR75-PR166 and 166-233 MHz AMD-K6 processors.
Innovative SeePU technology (simple CPU installation via BIOS)
Optional Support FAN78 system monitor
ChipSet: Intel 82430TX two chip PCISet
512 KB built-in Pipelined Burst SRAM
Supports up to 256MB FP, EDO and Synchronous DRAM modules

Bios: Award System BIOS supports PnP, APM, DMI, Multi-device booting features

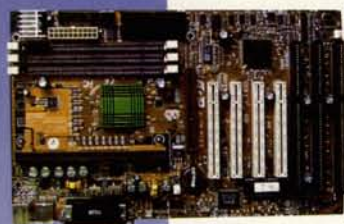
PCI IDE: Supports PIO mode 4, multi-word DMA mode 2 and Ultra DMA-33 timings
2S(16550A compliant) + 1P(SPP/EC/EP) + 1FD (up to 2.88MB, 3 Mode, 1Mbps transfer rate)
Supports IRDA IR function
Dual Channel USB Connector

Features: 68/75/83 Mhz system frequencies possibility
Supports Software power off control, Override power button, Modem ring power-on and Power-on by alarm
Flash BIOS protect, Reset switch protect via BIOS
Poly-switch overcurrent protection for USB and keyboard



MBCHA000 **\$175**

A Chaintech 6LTM mainboard based system was awarded the prestigious PC Pro Speed Award during a recent product review by UK's PC Pro magazine.



System Processor: Supports up to 333Mhz Intel Pentium II processors
Slot 1 CPU socket with retention mechanism
Supports 60/66 Mhz system clock speeds
Innovative SeePU technology (Jumper free CPU installation via BIOS)
ChipSet: Intel 82440LX two chip PCISet
AGP (Accelerated Graphics Port) Slot
DRAM Memory Supports up to 384Mb EDO and Synchronous DRAM modules

Bios: Provides single bit ECC capability
Boot-block Flash BIOS Award System BIOS supports PnP, APM, DMI, Multi-device booting features

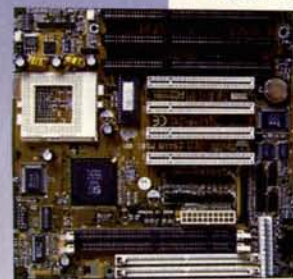
PCI IDE: Supports up to PIO Mode 4, Multiword Mode 2 and Ultra DMA-33 timings

On Board Ultra I/O
2S(16550A compliant) + 1P(SPP/EC/EP) + 1FD(up to 2.88MB, 3 Mode and 1Mbps transfer rate)
Supports IrDA IR function
Two USB ports On Board

Features: 68/75/83Mhz system frequencies possibility
Supports Software power off control, Override power button, keyboard power-on, Modem ring power-on and Power-on by alarm
Flash BIOS protect, Reset switch protect via BIOS
Poly-switch overcurrent protection for USB and keyboard.

MBCHA001 **\$255**

Value for money Pentium mainboard with all the advanced features including UDMA and SDRAM support.



System Processor: Supports up to 233Mhz Pentium® processors, Cyrix/IBM 6x86/6x86L PR120+ ~PR200+ (processor rev. 2.7 or later) and 6x86MX PR166+~PR233+ processors, AMD K5™ PR75~PR166 and 166~266Mhz K6 processors
ChipSet: SIS 5582 single chip PCISet
Cache Memory 512 KB built-in Pipelined Burst SRAM
DRAM Memory Supports up to 256MB FP, EDO, Synchronous DRAM modules
Provides up to 128MB DRAM cacheability
Bios: Boot-block Flash ROM
Award System BIOS with PnP, APM, DMI, Multi-device

booting features

PCI IDE: Special PCI Asynchronous Mode for 50/75/83 Mhz system frequencies possible.

Supports PIO Mode 4, Multi-word DMA Mode 2 and Ultra DMA-33 timings
Bus Mastering software drivers for all well-known multi-task operating systems.

On-Board Ultra I/O
2S(16550A) + 1P(SPP/EC/EP) + 1FD (up to 2.88MB, 3 Mode and 1Mbps transfer rate)
Supports IrDA IR function
Dual Channel USB Connector

Features: ATX power supply connector supports Software power off control, Override power button, Modem ring power-on and Power-on by alarm
Flash BIOS protect, Reset switch protect via BIOS
Poly-switch overcurrent protection for USB and keyboard

MBCHA002 **\$135**

New 3D AGP Graphics Card Cirrus Logic Laguna family.



Internal 64-bit GUI engine and advanced Texture Map Management support leading 2D and 3D acceleration
Guaranteed flicker-free by supporting up to 85Hz refresh rate and 1600x1200x1256 resolution
Provides up to 4Mb advanced Rambus DRAM
Supports smooth, full screen video playback

DCCHA000 **\$155**

Storage



Backpack 800TD EXT. \$290 BUBAC000 Panasonic

The easy way to copy, backup and transfer files from PC to PC via the parallel port. Each tape is capable of holding 800MB of information while the drive itself is compatible with Travan TR-1 and QIC80 tapes.

Code	Model	Price
MMPAN000	24x Panasonic Cd-Rom Drive	\$145
MMPAN001	24x Panasonic SCSI CD-Rom Drive	\$245



EXABYTE TR-41 INT. \$545 BUEXA000

Eagle TR-41

The Eagle TR-41 is capable of backing up 8GB per tape compressed while maintaining compatibility with all PC's via the IDE port.

SONY 3.5" DAT SCSI DRIVES

Code	Model	Price
BUSON000	SONY SDT4000 2/4GB INT DDS-1	\$1250
BUSON000	SONY SDT5000 4/8GB INT DDS-2	\$1550
BUSON000	SONY SDT5000 4/8GB EXT DDS-2	\$1850

3M TRAVAN TR-1 400/800MB. \$245 BU3M0000



Travan TR-1

Tape backup hasn't been easier with the Travan TR-1 drive. Compatible with both TR-1 and QIC80 tapes, this drive can be installed on any PC via the parallel port, running Windows 3.x, Windows 95 or DOS. Automated backups could not be simpler

Tape Cartridges

Code	Model	Price
BUGEN000	QIC80 DC2120 120MB/250MB COMP	\$35
BUGEN001	QIC-3020 MC300XL 680MB/1.36GB COMP	\$45
BUGEN002	QIC-WIDE 520 200MB/400MB COMP	\$45
BUGEN003	TARVAN TR-1 400MB/800MB COMP	\$49
BUGEN004	TARVAN TR-2 800MB/1.6GB COMP	\$55
BUGEN005	TARVAN TR-3 1.6GB/3.2GB COMP	\$59
BUGEN006	TARVAN TR-4 4GB/8GB COMP	\$65
BUGEN007	4MM DAT DDS-1 90M 2GB/4GB COMP	\$35
BUGEN008	4MM DAT DDS-2 120M 4GB/8GB COMP	\$39

Cases & Power Supplies

ADE Cases

Code	Model	Price
CAADE000	ADE MINITOWER CASE	\$65
CAADE001	ADE DESKTOP CASE	\$69
CAADE002	ADE MIDITOWER CASE	\$95
CAADE003	ADE FULL TOWER CASE	\$135
CAADE005	ADE-SERVER FULL TOWER CASE 300W	\$225
CAADE006	ADE-SERVER SQUARE CASE	\$299
CAADE011	ADE FULL TOWER ATX CASE	\$225

ADE Deluxe Cases

Code	Model	Price
CAADE010	ADE DELUXE MINITOWER CASE	\$85
CAADE012	ADE DELUXE AT/ATX DESKTOP CASE	\$135
CAADE004	ADE DELUXE AT/ATX MID CASE	\$135

Misc. Cases

Code	Model	Price
CAADE007	External 5.25" SCSI Case	\$155
CAADE008	External 5.25" IDE CD-ROM Drive	\$155
MSADE000	IDE Removable HDD Rack	\$35
MSADE001	SCSI Removable HDD Rack	\$39

*ALL Cases include Power Supplies

Power Supplies

Code	Model	Price
PSGEN000	200W POWER SUPPLY	\$45
PSGEN001	300W POWER SUPPLY	\$95
PSGEN002	200W ATX POWER	\$55
PSAPC000	APC BACK-UPS 400	\$325
PSAPC001	APC BACK-UPS PRO 420	\$450
PSAPC002	APC BACK-UPS PRO 650	\$530
PSAPC003	APC SMART-UPS 700	\$795



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Hard Disks



Quantum Fireball SE

Quantum Blistering Fast, High performance drives for the desktop or workstation
CAPACITY FOR THE EXTRAORDINARY™ The Fireball SE range of hard drives builds on Quantum's renowned reputation of quality and performance. It has a fast average seek time - 9.5 milliseconds and internal data rates up to 158 megabits per second at 5400 rpm. It also uses the Ultra ATA interface, with a data burst transfer rate of 33.3 megabytes per second. Furthermore the Fireball SE is available in both IDE and SCSI models.

IDE 3.5" - Fireball SE

Code	Model	Capacity (GB)	Cache	Price
HDQTM017	Fireball SE	2.1	128KB	\$310
HDQTM018	Fireball SE	3.2	128KB	\$355
HDQTM019	Fireball SE	4.3	128KB	\$425
HDQTM020	Fireball SE	6.4	128KB	\$575
HDQTM021	Fireball SE	8.4	128KB	\$725

SCSI 3.5" - Fireball ST Ultra SCSI

Code	Model	Capacity (GB)	Cache	Transfer Rate	Price
HDQTM022	Fireball SE	2.1	512KB	20MB/s	\$425
HDQTM023	Fireball SE	3.2	512KB	20MB/s	\$495
HDQTM024	Fireball SE	4.3	512KB	20MB/s	\$565
HDQTM025	Fireball SE	6.4	512KB	20MB/s	\$725
HDQTM026	Fireball SE	8.4	512KB	20MB/s	\$950

IDE and EIDE hard drives are used commonly in personal computers and low end workstations

SCSI hard drives are more commonly found in network servers and high end workstations due to their higher overall throughput.

Ultra DMA

This EIDE technology effectively doubles the transfer rate to 33mb/s

Ultra SCSI

Hard drives which have an Ultra SCSI interface are capable of transfer rates as high as 20mb/s. UltraWide SCSI can transfer as much as 40mb/s.

Seagate The Barracuda range of SCSI hard drives provide unmatched performance and reliability for workstations and file servers. With motor speeds of 7200 rpm and an average seek time of 8ms, these drives are able to cater for the most demanding applications.

SCSI 3.5" - Seagate Barracuda

Code	Model	Capacity (GB)	Cache	Interface	Transfer Rate	Price
HDSGT011	Barracuda 4XL	4.5	512KB	Ultra	20MB/s	\$1195
HDSGT012	Barracuda 4XL	4.5	512KB	Ultra Wide	40MB/s	\$1250
HDSGT013	Barracuda 9	9.1	512KB	Ultra	20MB/s	\$1650
HDSEA014	Barracuda 9	9.1	512KB	Ultra Wide	40MB/s	\$1750

SCSI Controllers



Adaptec, the industry standard in entry level and high end SCSI controllers. Now available in both OEM and Retail packaging.



Legend:

U = Ultra

UW = Ultra Wide

K = retail kit with cables, software and drivers

Adaptec Desktop SCSI

Suited for the personal workstation and entry level servers.

Code	Model	Tfr Rate Mb/s	Price
CCGEN001	AHA-1520	10	\$165
CCGEN012	AHA-2920K	10	\$275
CCGEN003	AHA-2940U	20	\$375
CCGEN004	AHA-2940UK	20	\$415
CCGEN005	AHA-2940UW	40	\$425
CCGEN006	AHA-2940UWK	40	\$495

Adaptec PCI High-End SCSI

Suited to mid to high end servers.

Code	Model	Tfr Rate Mb/s	Price
CCGEN007	AHA-3940U	40	\$695
CCGEN013	AHA-3940UK	40	\$795
CCGEN008	AHA-3940UW	80	\$795
CCGEN014	AHA-3940UWK	80	\$845

Adaptec Array Adapter Kits (RAID)

Aimed at servers running mission critical applications.

Code	Model	Tfr Rate Mb/s	Price
CCGEN009	AAA131K	40	\$835
CCGEN010	AAA133K	120	\$1390

Adaptec Slim SCSI for Notebook

Code	Model	Tfr Rate Mb/s	Price
CCGEN011	AHA1460	20	\$325

Maxtor®



ULTRA DMA

Gear up for transfer rates like you've never seen. Maxtor drives already grab the checkered flag in almost every benchmark test - now we're adding UltraDMA interface for blazing transfer rates of up to 33 MB a second! Whether you're running graphic or video programs, spreadsheets or downloading from the internet, you want acceleration that will make your applications fly. So go ahead - take a Maxtor hard drive with UltraDMA out for a spin!

Hard Disk Drives

Maxtor® HD DRIVES

Code	Model	Cap. GB	Seek ms	Motor RPM	Price
HDMAX003	DIAMONDMAX	2.1	<9.7	5200	\$325
HDMAX004	DIAMONDMAX	4.3	<9.7	5200	\$395
HDMAX007	DIAMONDMAX	6.4	<9.7	5200	\$535
HDMAX009	DIAMONDMAX	8.4	<9.7	5200	\$745



Key Features

- 3.5-inch hard drives
- 8.4/ 6.4/4.3/ 2.1 gigabyte formatted capacity
- UltraDMA/Fast ATA-4 interface
- < 9.7-millisecond seek performance
- UltraDMA data transfers
- 5200 RPM

Maxtor's DiamondMax™ EIDE hard drives have a reputation for outstanding performance and reliability. The new DiamondMax™ 2160 series is no exception. These drives sport up to 8.4 GB of formatted capacity and a sub-9.7 ms seek time.

This drive also features Formula4™ HDA and DSP-based electronics architecture, making it one of the best-performing drives in the industry.

New 8.4 GB from Maxtor!

Call our Free **1800 626 345** number now to place your order
Sales staff are available (est) 9am-6pm Monday to Friday, 10am-4pm Saturday
Free Technical Support (5 Days a week 9am-6pm) Phone (02) 9700 9354



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New Zip Plus

Everything a Zip drive has
... *Plus* more!

Up to 50X Faster Than a Floppy
Drive. In Windows® 95.
One Drive Fits All SCSI and Parallel
Ports
Lightweight Universal Power Supply
Hot Multimedia Software
Power On Off Switch.

Zip Plus Software:

- ImageAXS
- PhotoDelux
- Web Buddy
- Recordit
- NetCard
- Zip Tools



\$375

Jaz

BUIOM004	JAZ DRIVE (SCSI INT.) – 1.0GB	\$565
BUIOM003	JAZ DRIVE (SCSI EXT.) – 1.0GB	\$685

Media Accessories

BUIOM005	100MB PC ZIP DISKS (3 PER PACK)	\$85
BUIOM006	100MB PC ZIP DISKS (10 PER PACK)	\$215
BUIOM010	100MB MAC ZIP DISK	\$25
BUIOM008	JAZ MEDIA 1GB PC DISKS (3 PER PACK)	\$465
BUIOM009	JAZ MEDIA 1GB MAC DISKS (3 PER PACK)	\$495
BUIOM015	ZIP ZOOM SCSI ISA CARD	\$85
BUIOM013	IOMEGA JAZ TRAVELLOR	\$75
BUIOM014	ZIP DRIVE CARRY CASE	\$22



jaz drive

\$259

Zip

Code	Model	Price
BUIOM000	ZIP DRIVE EXT. (PARALLEL PORT) – 100MB	\$259
BUIOM001	ZIP DRIVE EXT. (SCSI PORT) – 100MB	\$259
BUIOM007	100MB ZIP INT IDE	\$185
BUIOM011	ZIP PLUS	\$375

zip drive

The Zip drive comes with some pretty nifty features:

- It's portable so you can move files from work to home and back again.
- 100 Megabyte disks allow you to organize and store all your stuff. When you get more stuff, just get more disks.
- Zip™ Tools software will help you store, share, back up, organize and manage all that stuff.

\$685

The Jaz drive comes with some pretty cool features:



- With whopping 1GB (yeah, gigabyte) cartridges, you'll never run out of space. It's the super fast, extremely vast personal storage drive.
- 10-12 millisecond seek time means performance faster than most hard drives.
- Lightweight external drive weighs only 2 pounds, so it's very portable. Now connect to your printer port. No SCSI card needed!(with optional Jaz Traveller) Or choose the internal version.
- New, handier size

CREATIVE



THE HOTTEST UPGRADES CREATE THE **Cool**est PC

Graphics Blaster Extreme

The Winning 2D/3D Overall Graphics Performance Ever

- Lightning fast 2D, 3D and enhanced video playback for all your graphics applications
- 4MB of SGRAM and a 230MHz DAC to deliver the highest performance, resolutions and refresh rates
- Performance tuned drivers for Windows 95 and Windows NT4.0, including full support for OpenGL, DirectX and HEIDI
- Modular Connectors provide upgradeability to Creative's Dxr2



PC-DVD Playback or Video and TV Output

MMCRE008 **\$345**

PC-DVD Encore Dxr2

is the All-in-One-System. You Get:

- DVD Player for TV
- DVD Player for PC
- 20X Speed CD-ROM Drive
- 2nd Generation DVD-ROM Drive
- Video CD (H/W MPEG-1) Player
- Dxr2 Technology
- Dolby Digital (AC-3) Audio



MMCRE016 **\$745**

**Awesome Features of the
Sound Blaster™ AWE64 Value:**

- Reproduces Sound from a Library of Real, Hi-Fidelity Samples or SoundFonts™
- Delivers AWESome Audio with Advanced WavEffects™ Synthesis
- Creative WaveGuide Synthesis for Natural Expressive Sound
- Powerful Synthesizers

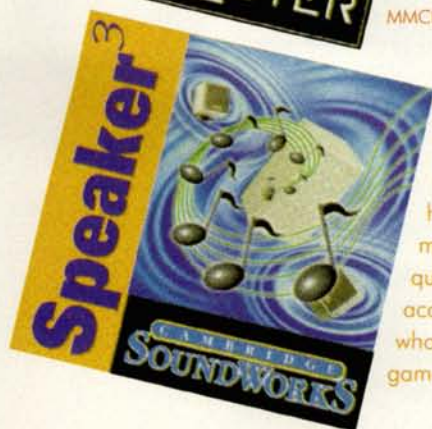
MMCRE011 **\$175**

Sound Blaster™ 16 MMCRE013 **\$75**



Chest-Thumping Soul-Satisfying Sound

Creative offers a breakthrough 3-piece speaker system that's tiny in size but huge in sound. The first of this affordable line is Creative PCWorks for home multimedia entertainment. Creative SoundWorks is your best buy for high quality, wide-range, natural sound with bigger dynamism. Having 4 times the acoustic output of most multimedia speakers, Creative MicroWorks is for those who demand incredibly accurate sound, uncompromising audio for music, games and multimedia.



Code	Description	Price
MMCRE020	PCWorks 7 Watt RMS Satellite, 10 Watt RMS Subwoofer	\$249
MMCRE021	SoundWorks 8 Watt RMS Satellite, 13 Watt RMS Subwoofer	\$475
MMCRE022	MicroWorks 26 Watt RMS Satellite, 43 Watt RMS Subwoofer	\$745

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JAZZ



Model:

Peak Power Output:

Drivers:

W x H x D:

Code:

Price:

J-100

100W

One 3" Full Range Cone

127mmx280mmx127mm

MMJAZ001

\$75

J-200

200W

One 3" Full Range Cone

One 1" High Range Cone

127mmx280mmx127mm

MMJAZ002

\$95

J-300

300W

Two 3" Mid Range Cone

One 1" High Range Cone

127mmx280mmx127mm

MMJAZ003

\$109



J-930 (J-900 + J-300)

J-900 MMJAZ004 **\$109**

- Peak Music Power Output: 300W
- Drivers: 4" Woofer Cone
- Frequency Response: 35Hz-250Hz
- Controls: Power, ON/OFF, Volume
- Input: 3.5mm Phone Jack
DC Input Jack
- Indicator: Power Led
- (WxHxD): 320mm x 220mm x 150mm

J-930 MMJAZ005 **\$199**



J-211 MMJAZ000

- Peak Music Power Output: 25W
- Drivers: One 3" Full Range Cone
- Controls: Power, Volume
- Input: 3.5mm stereo plug
- (WxHxD): 82mmx180mmx118mm

\$30



J-908ST MMJAZ015

- Peak Music Power Output: 400W
- Drivers: One 4" Subwoofer Cone
One 3" Full Range Cone
One 1" High Range Cone
- Frequency Response: Subwoofer 35Hz-250Hz
Satellites 100Hz-15KHz
- 3D Controls: On/Off
- Controls: Power/Volume
- Input: 3.5mm Stereo Plug
- Output: RCA Jack
- Indicator: Power LED

\$155

Adjustable 3D Sound

Models JS-200 and JS-300 offer customized 3D sound control not found on any other multimedia speaker. With the simple flip of the 3D sound to match your current application.



J-HS14 MMJAZ009

Multimedia combination headset and boom microphone

\$25



J-S124 MMJAZ007

Desktop Microphone including base

Input: 3.5mm Mini Stereo jack

\$15



TRAXDATA®



Traxdata products make it easy to record your own CD's with the very latest technology available. Providing a total solution to all **CD Recording needs** from a wide range of **hardware, software** and **blank media**, Traxdata has the winning edge! Whether your needs are to record CDs for Data, Music, or Video (or all of them), we have the kit that is right for you.

One of the most exciting advances in digital technology has been the development of Compact Discs and CD Recorders. It is now easy and affordable to make your own high quality digital recordings of music, computer data, photo and video files from your desktop.

Easy to install

Easy to use

Affordable

Make your own high quality CD's



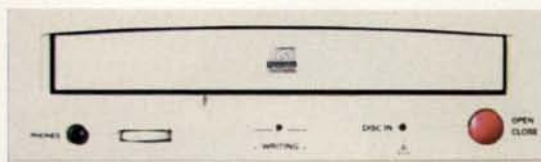
CDRW2260 EL PLUS

2x record, 2x rewrite, 6x playback
IDE interface for easy connectivity

Internal Recorder with:

- CD Recording Software
- UDF Recording Software (Win '95)
- Internal Power & SCSI Cables
- Label Design Templates
- Fixing Screws
- CD Marker Pen
- Manuals

MMTRA004 **\$735**



CDRW4260 EL PRO

4x record, 2x rewrite, 6x playback
SCSI interface for high volume, high speed data transfer

Internal Recorder with:

- CD Recording Software
- UDF Recording Software (Win '95)
- Internal Power & SCSI Cables
- Label Design Templates
- Fixing Screws
- CD Marker Pen
- Manuals

MMTRA005 **\$1045**



CDR4120 EL PRO

4x record, 12x playback
The worlds fastest 4x record, 12x Playback drives
High speed CD-ROM read capability, with very fast access and low CPU utilisation supporting packet, disc at once and track at once recording modes

Internal Recorder with:

- CD Recording Software
- UDF Recording Software (Win '95)
- Internal Power & SCSI Cables
- Label Design Templates
- Fixing Screws
- CD Marker Pen
- Manuals

MMTRA002 **\$835**

PCI SCSI CARD

This Plug 'n' Play High Performance Bus Mastering PCI SCSI Controller Kit offers blisteringly fast data transfer rates of up to 20MB/sec, allowing large blocks of data to be handled with the minimum of CPU utilisation.

Includes:

- PCI bus mastering card
- 1xCDR
- Power & SCSI cable (int.)
- Installation software

MMTRA000 **\$135**



CDE4120 EL PRO

Recorder in external case with:

- Power Supply
- CD Recording Software
- UDF Recording Software (Win '95)
- 2 CD-R Discs
- External Power Cable
- External SCSI to SCSI-2 Cable
- Label Design Templates
- Fixing Screws
- CD Marker Pen
- Manuals

MMTRA003 **\$895**



BLANK CD-R
\$5

BLANK CD-RW
\$45

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**Mitsubishi Diamond
View 17"**



\$795.00 MOMIT 002

Mitsubishi Diamond View 17" Colour Monitor
Advanced Plug & Play compatibility
Superior image fidelity - 0.27DP
Freq H: 30-72 KHz, Freq V: 50-120 Hz
Maximum Resolution: 1280 x 1024 up to 60 Hz

\$ 2,950 MOMIT000

**Mitsubishi Diamond Pro
21" Colour Monitor**

A new DIAMONDTRON Monitor,
with the super-fine aperture
grille pitch of 0.28mm
Maximum Resolution
1280 x 1024



**Mitsubishi Diamond
Pro 21"**

\$955 MOMIT001

**Mitsubishi Diamond Pro
17" Colour Monitor**

DIAMONDTRON Monitor, with the
super-fine aperture grille pitch
of 0.25mm
Maximum Resolution
1280 x 1024 60Hz



**Mitsubishi Diamond
Pro 17"**

\$399 MOMIT003

**Mitsubishi Diamond View
15" Colour Monitor**

Advanced Plug & Play
Superior image fidelity 0.28DP
Maximum Resolution
1024 x 768 up to 66 Hz



**Mitsubishi Diamond
View 15"**

Input

- | | | |
|-----------|--|----------------|
| IOMIT 000 | Mitsubishi Diamond Touch Economical Keyboard | \$35.00 |
| IOMIT 001 | Mitsubishi Diamond Touch Ergonomic Keyboard | \$69.00 |



Media

- | | | |
|-----------|--|--|
| MMMIT 000 | Mitsubishi Diamond Data 24x CD-ROM Drive (int.) | |
| | •E-IDE/ATAPI interface | |
| | •3600KB/sec maximum data transfer rate (24x max) | |
| | •125ms typical access time | |



\$139.00

- | | | |
|-----------|---------------------------------------|--|
| BUMIT 000 | Mitsubishi LS - 120 - 120MB Capacity. | |
| | The new standard in diskette storage. | |

- | | | |
|-----------|--|----------------|
| BUMIT 001 | 120MB capacity diskettes to suit LS - 120 Drive | \$25.00 |
| FDMIT 000 | Mitsubishi Diamond Data 1.44MB Floppy disk drive | \$39.00 |

Mitsubishi LS-120 FACTS:

- Large storage capacity of 120MB in a single LS-120 diskette.
- 100% compatability with existing 3.5" diskette media
- Supported by MS DOS, Windows (3X, 95, NT)
- 5 times faster than standard 1.44MB drives when using LS-120 diskettes
- Bootable, can act as a Boot Drive when appropriate BIOS installed
- Internal Drive



Monitors



SONY



300sf Trinitron Graphics Display

- 20" Trinitron CRT with 19" viewable image size for superior image quality
- Windows 95, plug and play compatible
- Digital Multiscan Technology to support multiple PC and Macintosh resolutions
- Recommended resolution of 1280 x 1024 @ 80 Hz non-interlaced
- 472 x 493.5 x 501 mm **\$2995** MOSON002



200sf Trinitron Graphics Display

- 17" Trinitron CRT with 15.9" viewable image size for excellent picture quality
- Windows 95, plug and play compatible
- Digital Multiscan Technology to support multiple PC and Macintosh resolutions
- Recommended resolution of 1280 x 1024 @ 75 Hz non-interlaced
- 406 x 427 x 451 mm **\$1295** MOSON001



100sf Trinitron Graphics Display

- 15" Trinitron CRT with 13.9" viewable image size for excellent picture quality
- Windows 95, plug and play compatible
- Digital Multiscan Technology to support multiple PC and Macintosh resolutions
- Recommended resolution of 1024 x 768 @ 85 Hz non-interlaced
- 368 x 373 x 384.5 mm **\$675** MOSON000

GENERAL

Code	Model	Price
MOGEN0	14" SVGA 0.28DP - 1024x768	\$275
MOGEN01	15" XGA 0.28DP - 11024x768	\$375
Digital Controls, Non-Interlaced, Plug & Play.		

Modems

Netcomm 56K

Code	Model	Price
FMNET007	InModem 56K Internal Modem	\$235
FMNET012	Roadster 56K Ultra SVD External Modem	\$275
FMNET002	PCMCIA CardModem 56K	\$395
FMNET008	PCMCIA CardModem 56K + Ethernet	\$505



Banksia

Code	Model	Price
FMBAN003	Wave SP 56K SVD External	\$269



US Robotics

Code	Model	Price
FMROB006	Sportster Flash 56K External	\$275
FMROB007	Winmodem Voice 56K Internal	\$225



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SPIRIT

MODEMS



Spirit 560SP External 56,000bps **FMSPI007 \$199**

Internet Voice fax/modem with Speakerphone + SVD external 56k high speed fax/modem that supports the Rockwell K56Flex standard and popular data & fax standards up to 33,600bps. Hardware based error correction & data compression. Includes

Windows fax and communications software with voice mail system, plus Windows Internet software.

All Modems include:

9/25 serial cable (external models)

Power supply and phone cord (all models)

Installation instructions and documentation

Software: Internet dialler & browser, data terminal emulation software, send receive fax application, professional voice mail system



NEW TV TUNER

Spirit TV Video Card **MMSP1000 \$149.00**

Turn your PC into a TV. PCI card that brings full TV reception capabilities to your PC. Features full motion video and "still" capture. It will take video IN from another source (like a Camcorder), show it, play it, and save it on your PC.

Requirements: Windows95 directx (add on) and a PCI bus master slot required.

Code	Description	Price
FMSPI006	Int. 56K,SVD, Spk Ph.	\$169
FMSPI000	336EL Ext. 33.6K ,SVD, Spk Ph.	\$129
FMSPI004	Int. 33.6K,SVD, Spk Ph.	\$Call

PCMCIA

Spirit Ventura

The perfect notebook partner that's GSM Digital Mobile ready! Our best PCMCIA (PC-Card) product. 33,600bps data and 14,400bps fax capability.

Connection kits available for Nokia 8110 / 3810, 2110, Motorola and many more GSM mobile phones. \$ Call for details.

FMSPI005 \$375



Spirit PCMCIA Ethernet Adapter

Connect your laptop to your Network using this high speed adapter. Compliant with 10BASE-T/2 specifications, NE2000 compatible and auto-configurable. Auto-detecting connector in use and "Hot-swap" insertion and removal. Shielded RJ-45 /BNC connectors. Driver support for major Network Operating systems.

FMSPI000 \$149

NETWORKING

Spirit 5 Port Hub

Equipped with 6 LEDs for easy viewing and troubleshooting. Convenient sliding covers allows you to select either external DC power adapter or IBM PS/2 compatible keyboard direct power cable. 5th port also doubles as an uplink port.

FMSPI003 \$89



Spirit Network Cards

PCI network card has full duplex operation support. Automatic PCI configuration without jumpers. Has both RJ-45 and BNC connections.

FMSPI002 \$49

LAN Pack - P'nP - 10BaseT **NWSP1004 \$299.00**

Complete network starter kit includes 1 PCI & 3 ISA network adapters, a 5 port hub and 4 x 8Metre UTP cables. P'nP, 10 Mbps components can operate in Full Duplex Mode to achieve 20Mbps throughput. Detailed step-by-step installation instructions, locally designed and written for the new user. Documentation covers; familiarisation, topology, planning, hardware installation and testing.

ISA Plug n Play network card also available **FMSPI001 \$39**

HOT KEY



Dr Solomon's Anti-Virus

Dr Solomon's Anti-Virus, a renowned leader in antivirus software is now finally available in Australia. Dr Solomon's Anti-Virus automatically detects, identifies and disinfects viruses with its exclusive VirusGuard, WinGuard and NetGuard.

With world wide 24 hour technical support, its no wonder Dr Solomon's is trusted by over 3 million users world wide.

SWHOT000 \$85



ChromaFax

Wish you could fax in color? Well the solution is here now. With ChromaFax anyone with a PC fax/modem can fax off presentations, designs and reports in full colour. Because ChromaFax supports international fax standards, it can communicate with the millions of installed fax machines around the world. As a bonus ChromaFax Receiver is available free of charge to all PC users so that ChromaFax users can communicate with anyone in full colour.

SWHOT001 \$110

Ramgate

"The ultimate Windows crash protection"

Ramgate is a comprehensive Resource Manager that improves the way your PC manages memory when running Windows applications.

Eliminate Memory Based GPF's and improve stability with Ramgate V4.1 & Deluxe

SWHOT002 \$55



Video Director Studio 200

The VideoDirector is a consumer video editing system. Using VideoDirectorm, you can transform hours of raw camcorder footage into entertaining videotapes consisting of just the best shots in any order you want. Add professional effects including music, titles and transitions to give your videos the professional look. Best of all there is no need for any hardware upgrades to take

advantage of the VideoDirector as all editing is copied straight to a VHS or SVHS video tape.

Includes:

- VideoDirector 200 Mixer (connects to parallel port)
- Smart Cable (controls VCR / Camcorder)
- VideoDirector 3.0 Software
- Title Editor 3.0 Software
- Audio Editor Software
- Studio Grabber Software
- Clip Media (CDROM)

MMHOT000 \$635



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Canon

BJC-80 **\$435** PRCAN000



- Drop Modulation Technology - the dual drop size breakthrough that produces smoother colour gradations.
- Office laser quality finish and B&W speeds up to 5 pages per minute with dedicated black cartridge.
- Windows® 95 compatible IrDA infrared port for cable-less communications.
- Fits in half a briefcase, weighs only 1.4Kg!

• Optional scanner head for colour graphics, OCR and faxing.

\$155 PRCAN011

BJC-210SP **\$195** PRCAN002



- Super Economy mode for colour and B&W.
- Photo Mode printing for colour that rivals more expensive four-colour systems.
- Prints up to 2400 B&W pages and 600 colour pages.
- New high capacity black cartridge - 20% more ink, no extra cost.
- Up to 5 times the output of direct competitors.

BJC-240 **\$259** PRCAN010



- Complete colour kit, PhotoRealism™ cartridge, high resolution paper and colour cartridge included.
- Up to 720 dpi smoothing for finer detail.
- Fluorescent ink option for brighter charts, perfect for display and presentation materials.

LBP-660 **\$499** PRCAN011



- High speed
- True Performance
- High Resolution
- Outstanding line definition
- Better graphics and photo handling
- More user friendly
- Outstanding economy

BJC-4200 **\$295** PRCAN003



- Offers speed and versatility at an unbeatable price.
- Outstanding plain paper output, Photo Mode colour up to 720 dpi.
- Four ink options for any printing task; Standard colour, high speed black, PhotoRealism and Fluorescent ink.
- PhotoRealism printing for photographic reproduction with richer, more life-like colours.
- Fluorescent ink option

BJC-4550 **\$675** PRCAN005



- Everything you could want in a desktop printer.
- A3 colour printing, perfect for CAD, DTP and spreadsheet work.
- Automatic switching for Windows® 3.11/95 and Macintosh®.
- Dedicated black ink cartridge for fast B&W printing.
- PhotoRealism option for photographic reproduction with richer, more life-like colours.
- Fluorescent ink option

BJC-7000 **\$635** PRCAN012



- 7-colour ink system and 9 saturation levels per pixel for incredibly rich photographic half-tones.
- Combined total of 1088 print nozzles firing up to 10,000 drops per second!
- P-POP (Plain Paper Optimised Printing) gives plain paper a coated paper quality finish.
- Documents printed with P-POP are 99.4% water fast!

BJC-5500 **\$1295** PRCAN013



- Outstanding Photo Mode colour printing up to 720 dpi resolution on plain paper.
- Exceptionally fast B&W printing - without the noise of impact printers.
- Tractor feed for full width computer paper built-in.
- A3 CAD drawings on plain, coated and glossy paper.
- Create A2 posters and displays on high gloss and back print film.

Printers & Consumables



EPSON

Code	Model	Price
PREPS000	STYLUS COL. 200, 720X360 DPI, 240CPS	\$275
PREPS001	STYLUS COL. 400, 720X720 DPI, 3PPM, WIN COMP.	\$299
PREPS002	STYLUS COL. 600, 1440X720 DPI, 3PPM, WIN COMP.	\$445
PREPS003	STYLUS COL. 800, 1440X720 DPI, 7PPM	\$675
PREPS011	STYLUS PHOTO COLOUR 720X720	\$795
PREPS005	STYLUS COL. PRO XL, 720X720 DPI FULL BLEED A3	\$1915
PREPS010	STYLUS COL. 1520 1440X720 DPI	\$1695
PREPS007	LQ-570+ 24PIN MATRIX	\$575



Canon

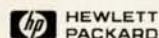
Code	Description	Printer compatibility	Price	Code	Description	Printer compatibility	Price
INCAN000	BC01 BLACK	BJ10/20	\$39	INHPD008	HP51649A COLOR	HP 600 SERIES	\$44.50
INCAN001	BC02 BLACK	BJ200/BJ210/BJ240	\$39	INHPD009	HP51641A COLOR	HP850C/890C	\$49
INCAN002	BC05 COLOR	BJ210/240	\$49	INHPD010	HP51640C CYAN	DJ1200/1600	\$44.50
INCAN003	BC06 PHOTO COLOR	BJ240	\$49	INHPD011	HP51640M MAGENTA	DJ1200/1600	\$44.50
INCAN004	BC06 PHOTO COLOR KIT	BJ240	\$65	INHPD012	HP51640Y YELLOW	DJ1200/1600	\$44.50
INCAN005	BC09F FLURO COLOR	BJ210/BJ240	\$79	INHPD013	HP COLOR PHOTO KIT	HP690C	\$79
INCAN006	BC10 BLACK & HEAD	BJ30/BJ70	\$55	INHPD014	HP PHOTO CARTRIDGE	HP300/400/540	\$49
INCAN007	BC1-10 BLACK	BJ30/70	\$25				
INCAN008	BC11 COLOR & HEAD	BJ70	\$65				
INCAN009	BC1-11 BLACK (3 PK)	BJ70	\$19				
INCAN010	BC1-11C COLOR (3 PK)	BJ70	\$35				
INCAN011	BC20 BLACK & HEAD	BJ4000 SERIES	\$49				
INCAN012	BC21 COLOR & BLACK	BJ4000 SERIES	\$75				
INCAN013	BC121 BLACK	BJ4000 SERIES	\$25				
INCAN014	BC121C TRI-COLOR	BJ4000 SERIES	\$29				
INCAN015	BC22 PHOTO	BJ4200/BJ4500	\$75				
INCAN016	BC22 PHOTO KIT	BJ4200/BJ4500	\$95				
INCAN017	BC29F FLURO COLOR	BJ4000 SERIES	\$75				
INCAN018	BJI201B BLACK	BJ600 SERIES	\$25				
INCAN019	BJI201C CYAN	BJ600 SERIES	\$15.50				
INCAN020	BJI201M MAGENTA	BJ600 SERIES	\$15.50				
INCAN021	BJI201Y YELLOW	BJ600 SERIES	\$15.50				
INCAN022	BJI642 BLACK	BJ300/330	\$29				
INCAN023	BJI643 BLACK	BJ800/880	\$45				
INCAN024	BJI643C CYAN	BJ800/880	\$49				
INCAN025	BJI643M MAGENTA	BJ800/880	\$49				
INCAN026	BJI643Y YELLOW	BJ800/880	\$49				
INCAN027	BJI801 BLACK	BJ80	\$35				
INCAN028	BC03 BLACK	BJ210SP	\$45				
INCAN029	BC60 BLACK	BJC7000	\$59				
INCAN030	BC61 COLOR	BJC7000	\$69				
INCAN031	BC62 PHOTO COLOR	BJC7000	\$95				

EPSON

Code	Description	Printer compatibility	Price
INEPS000	SO20002 BLACK	SQ850	\$79
INEPS001	SO20003 BLACK	EPJ-200	\$59
INEPS002	SO20010 BLACK	SQ-870/1170	\$59
INEPS003	SO20025 BLACK	400/800/1000	\$30
INEPS004	SO20034 BLACK	COLOR/PRO/PROXL	\$55
INEPS005	SO20036 COLOR	COLOR/PRO/PROXL	\$79
INEPS006	SO20047 BLACK	200/820/II/IS	\$35
INEPS007	SO20049 COLOR	II/IS/820/1500	\$45
INEPS008	SO20062 BLACK	STYLUS 1500	\$59
INEPS009	SO20066 COLOR	STYLUS PRO XL+	\$85
INEPS010	SO20089 COLOR	400/600/800/1520	\$45
INEPS011	SO20093 BLACK	C400/500/600	\$35
INEPS012	SO20097 COLOR	C500/200	\$49
INEPS013	SO20108 BLACK	C800/1520	\$45
INEPS014	SO20110 COLOR	COLOR PHOTO	\$75

HP HEWLETT PACKARD TONER CARTRIDGE

Code	Description	Printer compatibility	Price
TOHPD000	HP92295A	HP LASERJET II/III	\$125
TOHPD001	HP92274A	HP 4L/4ML/4P/4MP	\$115
TOHPD002	HP-C3906A	HP LASERJET 5L	\$99
TOHPD003	HP92275A	HP IIP/IIIP/IIIP+	\$149
TOHPD004	HP92291A	HP 4SI/4SI MX/3SI	\$220
TOHPD005	HP-C3900A	HP 5SI/5SI MX	\$325
TOHPD006	HP92298Z	HP 4/4M/5/5N/5M	\$165
TOHPD007	HP-C3900A	HP 4V/4MV	\$275
TOHPD008	HP	HP 5P/5MP/6P/6MP	\$130



Code	Description	Printer compatibility	Price
INHPD000	HP51633M BLACK	HP PORTABLE	\$39
INHPD001	HP5162A BLACK	HP 500 SERIES	\$39
INHPD002	HP51629A BLACK	HP 600 SERIES	\$45
INHPD003	HP51645A BLACK	HP850C/1600	\$45
INHPD004	HP51640A BLACK	DJ 1200 SERIES	\$39
INHPD005	HP51606A BLACK	HP PAINTJET XL	\$45
INHPD006	HP51639A BLACK	PAINTJET XL300	\$39
INHPD007	HP51625A COLOR	DJ500 SERIES	\$44.50



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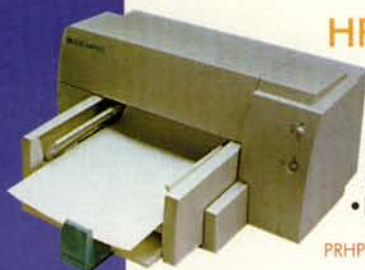
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**HEWLETT®
PACKARD**



HP670C

- 4ppm in black, 1.5 ppm in colour
- two cartridges, one black, one colour. So you can print in black and colour without switching cartridges
- HP Colour Smart and Real life Imaging System

PRHPD002 **\$285**

HP692C

- HP's most versatile colour printer. Prints on plain paper, card stock, stickers, labels, banners and even iron-on transfers.
- HP Photo Ret technology gives life like colour

PRHPD021 **\$385**

HP720



- Looking for a business printer that gives you sharper, more realistic colour for everything you print?
- PhotoREt II delivers smaller ink drops and more colour shades
- The HP Deskjet 720C is designed for Microsoft® Windows® 3.1x, Windows 95 and Windows® NT 4.0 operating systems and supports Intel's MMX technology for faster colour processing
- Prints fast- up to 8 pages per minute in black, 4 pages per minute in colour

PRHPD031 **\$599**

HP890C

- Up to 9ppm black
- New Photo RET II
- Professional Photo Quality output
- Optional HP JetDirect for Network Connection

PRHPD025 **\$785**



HP1120

- 600dpi C-REt & Colour Smart II
- Print on various mediums from Post Card to A3 Paper
- 3 paper paths
- 6ppm black and 3.5ppm colour
- Optional HP JetDirect for Network Connection

PRHPD032 **\$Call**



HP 6L

- Compact size
- 600dpi RET
- Up to (6ppm) makes the HP 6L the ideal printer for the home or small office

PRHPD009 **\$675**

HP OFFICEJET 635



- All in one colour printer, 600x300DPI resolution
- Plain Paper FAX
- Fast 14.4K Modem
- Digital Copier
- Scanner includes Omnipage Limited edition OCR Software
- Up to 5ppm black and 2ppm colour

PRHPD033 **\$999**

HP OFFICEJET 1150C

- Everything you need to print, copy and scan professional quality colour and B&W
- Digitally enhances images it copies to produce cleaner copies with accurate color

PRHPD020 **\$1435**

HP OFFICEJET 590
\$745

PRHPD023

HP 6P

- Up to 8ppm black
- 600dpi RET

- Two input sources including 250 sheet cassette tray
- Network Connection with Jet Direct

PRHPD010 **\$Call**



HP 6MP

(Postscript Version)
\$Call

PRHPD011

D-Link®



DFE-500TX PCI-bus 10/100M fast Ethernet network interface card

Intelligent Ethernet/Fast Ethernet adapter, Auto negotiating 10Base-T/100Base-TX (Nway), Plug and Play support, low CPU utilisation, 32 bit high performance bus master, Optional remote boot rom, Certified driver for Netware, SCO Unix, Windows 95 and Windows NT. **NWDLI002 \$85**



DE-660CT PC Card Ethernet network interface card with RJ-45/BNC connectors, J1T1 function supported

Combo PCMCIA card with RJ-45 & BNC connectors, Full plug and play, Autodetection of cable type, Supports full duplex, Netware, SCO Unix, Windows 95 and Windows NT compatible, Support D-link just-in-time-interrupt (JIT1) technology, 30% faster than other standard PCMCIA card. **NWDLI003 \$125**



DE-905/N Ethernet Network Kit (included 5-port Ethernet Hub & 2 ISA-bus Ethernet card)

Network kit for SOHO user, Easy to install, includes two Cat-5, 20 feet cables and AC power adapter for hub, simple plug-and-play installation, D-link hubby received CeBit 95 Highlight Award. **NWDLI006 \$195**



DES-1008/N 8-port Ethernet/Fast Ethernet Switch with 8x N-Way UTP ports

8 port UTP Auto negotiating 10/100Mbit switch (N-Way), Supports UTP/STP cables, MDI-II port, Support full/half duplex, Provides cut-through and fast store & forward switching, Auto polarity correction, Dynamic buffer allocation for network load balancing, Desktop size. **NWDLI008 \$1975**

Code	Model	Description	Price
NWDLI000	DE-220PCT	ISA Bus PnP Ethernet Adapter with RJ-45/BNC Connectors	\$35
NWDLI001	DE-528CT	PCI-bus Ethernet adapter with RJ-45/BNC connectors	\$50
NWDLI004	DE-809TC/N	8-port 10Base-T Ethernet Unmanaged Hub with BNC support	\$165
NWDLI005	DE-816TP/N	16-port 10Base-T Ethernet Unmanaged Hub with 1 AUI & 1 BNC ports (Rack-mount)	\$365
NWDLI007	DE-1824/N	24-port 10Base-T Ethernet Stackable Manageable Hub	\$995
NWDLI009	DE-855/N	Ethernet BNC-to-RJ-45 Media Converter	\$199
NWDLI010	DI-1135-11/TP	1 LAN, 2 WAN Ethernet Remote Router with ISDN S/T interface	\$1750

Networking

3Com

Fast Ethernet

10/100BASE-T Network Interface Cards
High-performance, reliable networking at 10 or 100 Mbps with parallel tasking technology.

Code	Model	Price
NW3C0005	3COM FAST ETHERLINK XL PCI 10/100BT	195
NW3C0006	3COM FAST ETHERLINK ISA 10/100	299

EtherLink XL and EtherLink III

10 Mbps Network Interface Cards The #1 best-selling Ethernet NICs, providing unmatched performance, reliability, and network functionality.

Code	Model	Price
NW3C0000	ETHERLINK III ISA TP (RJ-45)	\$145
NW3C0001	ETHERLINK III ISA COMBO	\$245
NW3C0002	ETHERLINK III ISA 3C509B-TPC	\$159
NW3C0003	ETHERLINK XL PCI TP	\$215
NW3C0004	ETHERLINK XL PCI COMBO	\$265

PCMCIA Cards

Code	Model	Price
NW3C0007	ETHERLINK III PCMCIA TP	\$275
NW3C0008	ETHERLINK III PCMCIA COMBO	\$365
NW3C0016	ETHERLINK III PCMCIA 10/100	\$315

INTEL

EtherExpress PRO Ethernet Cards. These adapters take full advantage of available bandwidth with its 32-bit bus-master architecture.

Code	Model	Price
NWGEN010	EtherExpress Pro PCI 10/100TX (RJ-45)	\$175
NWGEN013	EtherExpress Pro PCI COMBO	\$215
NWGEN009	EtherExpress Pro PCI TP	\$250
NWGEN014	EtherExpress Pro ISA COMBO	\$199

GENERIC

Code	Model	Price
NWGEN000	ISA Ethernet Card (COMBO)	\$35
NWGEN001	PCI Ethernet Card (COMBO)	\$40
NWGEN002	5 PORT HUB with up-link port	\$85
NWGEN003	8 PORT HUB with up-link port	\$115
NWGEN004	16 PORT HUB with up-link port	\$245
NWGEN006	Pocket Ethernet Parallel COMBO	\$179
NWGEN005	PCMCIA Ethernet Combo	\$175
NWGEN011	Ethernet Transceiver AUI to RJ-45	\$65
NWGEN012	Ethernet Transceiver AUI to BNC	\$65



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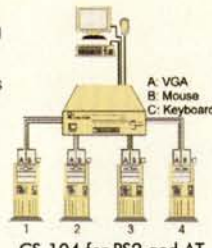
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Data Switches

CS-102/104/106

These CPU switches are useful for operating 2 to 6 computers from one keyboard, mouse and monitor. Ideal for administrators and those with more than 1 computer. Switching is done via an electronic button

Code	Model	Price
DSADE030	CS-102	\$245
DSADE019	CS-104	\$375
DSADE020	CS-106	\$395
CBGEN098	AT Cable Set	\$35
CBGEN099	PS/2 Cable Set	\$39

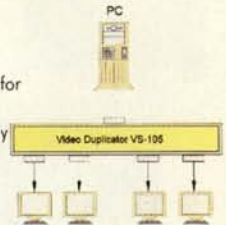


CS-104 for PS2 and AT
DS-ADE030/019/020

VS-102/104/108

These video splitters are the ideal solution for image duplication. Cascade ability allows infinite numbers of VGA monitors to display the same image. Great for presentations.

Code	Model	Price
DSADE000	VS-102	\$85
DSADE001	VS-104	\$125
DSADE002	VS-108	\$175

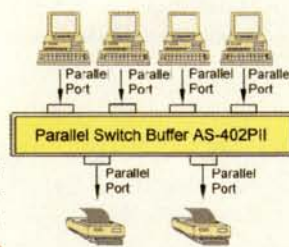


DS-ADE000/001/002

AS-402

If you have one or two printers, but 1 are four computers needing to share them, the AS-402 is the right choice

Code	Model	Price
DSADE010	AS-402	\$130

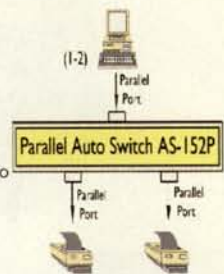


DS-ADE010

AS-152P/AS-154P

Bi-directional data switch allows 2/4 users to share 1 printer or a single user to use 2/4 printers. MAX 6M.

Code	Model	Price
DSADE013	AS-152P	\$55
DSADE014	AS-154P	\$65

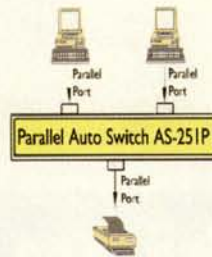


DS-ADE013/014

AS-251P/AS-451P

Non-powered 2/4 to 1 Parallel Auto switch for printers. MAX 6M.

Code	Model	Price
DSADE033	AS-251P	\$35
DSADE007	AS-451P	\$45

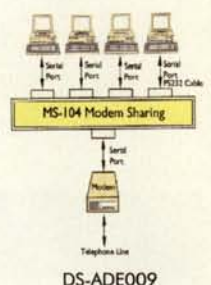


DS-ADE007/033

MS-104

Non-powered 4 to 1 modem-sharing device allows 4 users to share one modem using one phone line. Compatible with all modems at speeds of up to 56700 baud. MAX cable length of 15M.

Code	Model	Price
DSADE009	MS-104	\$145



DS-ADE009

Code	Description	Price
DSADE008	AS-811P, 8 Computer to share 1 Printer with buffer.	\$120
DSADE034	AS-422P, 4 to 2 concurrent Auto Switch buffer for sharing 2 printers amongst 4 computers. Up to 2 users can send files to print simultaneously at 100Kbs.	\$55
DSADE011	AS-411S, 4 Computers to share 1 serial printer auto switch with a maximum range of 15M.	\$95
DSADE012	AS-811S, 8 Computers to share 1 serial printer auto switch with a maximum range of 15M.	\$155
DSADE032	AS-251S, Non-powered 2 to 1 Serial Auto switch, ideal for serial printers with a range of 15M.	\$35
DSADE015	AS-451S, Non-powered 4 to 1 Serial Auto switch, ideal for serial printers with a range of 15M.	\$45
DSADE023	MS-201N, 2 to 1 serial Auto switch.	
DSADE016	SP-200, Non-powered serial to parallel converter	\$55
DSADE017	PS-200, Non-powered parallel to serial converter	\$55
DSADE003	IC-100, Serial/Parallel bi-directional converter. Allows parallel signals to travel over longer distances. 300-38400bps.	\$95
DSADE035	IC-150, Transfer data at distances of up to 10KM at 110bps or 800M at 19200bps. Can use either a 4 wire full duplex cable or 2 wire simplex cable.	\$55
DSADE024	EH-132, Portable 3.5" Hard Drive caddy which plugs straight into the parallel port of your computer. 40MB - 8.4GB limit.	\$165
DSADE025	EH-100, Portable 3.5" / 2.5" Hard Drive caddy which plugs straight into the parallel port of your computer. 40MB - 8.4GB limit.	\$145
DSADE005	IC-162T, Non powered parallel line extender. Transmitter and Receiver included. Max distance 610M.	\$65

CS-104



Front



Back

Cables & Adapters



Item Code	Description	Price			
PRINTER CABLES					
CB-GEN000	6FT PRINTER CABLE	\$5.00	CB-GEN067	20M COAXIAL CABLE WITH BNC	\$20.00
CB-GEN001	3 METERS PRINTER CABLE	\$9.00	CB-GEN068	30M COAXIAL CABLE WITH BNC	\$25.00
CB-GEN002	5 METERS PRINTER CABLE	\$12.00	CB-GEN069	50M COAXIAL CABLE WITH BNC	\$35.00
CB-GEN003	10 METERS PRINTER CABLE	\$19.00	CB-GEN070	BNC TERMINATOR	\$3.50
CB-GEN004	20 METERS PRINTER CABLE	\$25.00	CB-GEN071	BNC T CONNECTOR	\$3.50
CB-GEN088	1.8M IEEE1284 PRINTER CABLE	\$19.00	CB-GEN072	1M RJ45 CABLE	\$8.00
CB-GEN089	1.8M IEEE1284 PRINTER CABLE	\$20.00	CB-GEN073	2M RJ45 CABLE	\$10.00
DB25 CABLES					
CB-GEN008	1.8M SERIAL DB25M/DB25M	\$9.00	CB-GEN074	5M RJ45 CABLE	\$15.00
CB-GEN009	3M SERIAL DB25M/DB25M	\$15.00	CB-GEN075	8M RJ45 CABLE	\$19.00
CB-GEN010	5M SERIAL DB25M/DB25M	\$17.00	CB-GEN076	10M RJ45 CABLE	\$20.00
CB-GEN011	10M SERIAL DB25M/DB25M	\$20.00	CB-GEN077	15M RJ45 CABLE	\$25.00
CB-GEN012	20M SERIAL DB25M/DB25M	\$25.00	CB-GEN078	20M RJ45 CABLE	\$30.00
CB-GEN013	1.8M SERIAL DB25M/DB25F	\$9.00	CB-GEN079	25M RJ45 CABLE	\$35.00
CB-GEN014	3M SERIAL DB25M/DB25F	\$12.00	CB-GEN080	30M RJ45 CABLE	\$39.00
CB-GEN015	5M SERIAL DB25M/DB25F	\$15.00	CB-GEN081	40M RJ45 CABLE	\$45.00
CB-GEN016	10M SERIAL DB25M/DB25F	\$17.00	CB-GEN084	2 METRE RJ45 CABLE-CROSS	\$12.00
CB-GEN017	20M SERIAL DB25M/DB25F	\$25.00	CB-GEN085	3 METRE RJ45 CABLE-CROSS	\$15.00
CB-GEN018	1.8M DB25F/DB25F	\$9.00	CB-GEN086	5 METRE RJ45 CABLE-CROSS	\$19.00
CB-GEN019	3M SERIAL DB25F/DB25F	\$12.00	CB-GEN087	10 METRE RJ45 CABLE-CROSS	\$25.00
CB-GEN020	5M SERIAL DB25F/DB25F	\$17.00	CB-GEN091	0.5M RJ45 CABLE	\$7.00
CB-GEN021	10M SERIAL DB25F/DB25F	\$20.00	CB-GEN092	3M RJ45 CABLE	\$12.00
CB-GEN022	20M SERIAL DB25F/DB25F	\$25.00	CB-GEN093	3M COAXIAL CABLE WITH BNC	\$10.00
KEYBOARD & VGA CABLES					
CB-GEN023	1.8M KEYBOARD EXT M/F	\$9.00	CB-GEN094	15M COAXIAL CABLE WITH BNC	\$18.00
CB-GEN024	3M KEYBOARD EXT M/F	\$12.00	CB-GEN095	8M COAXIAL CABLE WITH BNC	\$15.00
CB-GEN025	5M KEYBOARD EXT M/F	\$15.00	CB-GEN096	12 METERS COAXIAL CABLE BNC	\$18.00
CB-GEN026	1.8M CURLY KB EXT M/F	\$10.00	CB-GEN097	18 METERS COAXIAL CABLE BNC	\$25.00
CB-GEN027	1.8M PS/2 KB EXT M/F	\$12.00	ADAPTERS		
CB-GEN028	1.8M PS/2 KEYBOARD M/M	\$12.00	CBGEN100	KEYBOARD ADAPTER 5F/6M	\$9.00
CB-GEN029	1.8M KEYBOARD CABLE M/M	\$10.00	CBGEN101	KEYBOARD ADAPTER 5M/6F	\$9.00
CB-GEN030	1.8M EGA/MOUSE EXT 9F/9M	\$9.00	CBGEN102	GENDER CHANGER DB25M/F	\$9.00
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CB-GEN032	1.8M VGA EXT 15M/15F	\$9.00	CBGEN104	DB25M/DE9F ADAPTER	\$9.00
CB-GEN036	MONITOR SPLITTER 15M/15F*2	\$15.00	CBGEN105	DB25F/DE9M ADAPTER	\$9.00
CB-GEN037	1.8M RGB CABLE 15M/BNC*5	\$25.00	CBGEN106	MIN DIN 6M/DE9M	\$9.00
CB-GEN082	5M VGA CABLE HD15M/HD15M	\$9.00	CBGEN107	MIN DIN 6F/DE9F	\$9.00
CB-GEN090	2M VGA TO EGA CABLE 9M/15M	\$9.00	CBGEN108	MIN DIN 6M/DE9F	\$9.00
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CB-GEN042	1M CENT50M TO CENT50M SCSI	\$15.00	CBGEN109	DE9F/HD15M ADAPTER	\$9.00
CB-GEN043	1.8M CENT 50M CENT 50M SCSI	\$17.00	CBGEN110	DE9M/HD15F ADAPTER	\$9.00
CB-GEN044	1M CENT 50M/DB25M SCSI	\$15.00	CBGEN111	DE9M/HD15M ADAPTER	\$9.00
CB-GEN045	CENT 50M SCSI TERM ACTIVE	\$25.00	CBGEN112	HD15M/HD15M ADAPTER	\$12.00
CB-GEN046	CENT 50M TERM/C50M/C50F	\$19.00	CBGEN113	HD15F/HD15F ADAPTER	\$12.00
CB-GEN047	1M HONDA 50M/CENT 50M	\$25.00	CBGEN114	DE9M/DE9M ADAPTER	\$9.00
CB-GEN048	1.8M HONDA50M/CENT50M	\$29.00	CBGEN115	DE9F/DE9F ADAPTER	\$9.00
CB-GEN049	1M HONDA 50M/DB25 SCSI II	\$25.00	CBGEN116	RJ45 TO DB25F CONNECTOR	\$9.00
CB-GEN050	1M HONDA 50M/HONDA 50M	\$39.00	CBGEN117	RJ45 TO DB 25M CONNECTOR	\$9.00
CB-GEN051	1M HONDA 68M/HONDA 68M	\$45.00	CBGEN118	RJ45 TO DB9F CONNECTOR	\$9.00
CB-GEN052	1M HONDA 68M/HON 50M	\$45.00	CBGEN119	RJ45 TO DB9M ADAPTER	\$9.00
CB-GEN053	1M HONDA 68M/CENT 50M	\$45.00	CBGEN120	DB25F/CN36M ADAPTER	\$9.00
CB-GEN054	HONDA 50M TERMINATOR ACT	\$25.00	CBGEN121	DB25M/CN36F ADAPTER	\$9.00
CB-GEN055	HONDA 68M TERMINATOR ACT	\$39.00	CBGEN122	DB25M/M NULL MODEM ADAP	\$12.00
CB-GEN056	INTERNAL TERMINATOR ACT	\$20.00	CBGEN123	DB25/DE9F ADAPTER	\$9.00
CB-GEN057	INTERNAL SCSI III	\$85.00	OTHERS		
CB-GEN060	INT SCSI CABLE 7 CONNECT	\$15.00	CBGEN006	1.8M 9F/25M MODEM CABLE	\$10.00
CB-GEN083	HONDA 68 TO DB25 M SCSI III	\$45.00	CBGEN007	1.6M 9F/25M/25F MODEM	\$15.00
NETWORKING					
CB-GEN064	2M COAXIAL CABLE WITH BNC	\$9.00	CBGEN038	1.8M PARA LAPLINK DB25M/M	\$12.00
CB-GEN065	5M COAXIAL CABLE WITH BNC	\$12.00	CBGEN039	5M PARAL LAPLINK DB25M/M	\$15.00
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IOGEN000	ENHANCED 104/WIN95	\$30
IOGEN001	HONEYWELL GENUINE - 104/WIN95	\$45
IOGEN010	GENERIC PS/2 Keyboard	\$45



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Code	Model	Price
IOGEN004	GENERIC 3 BUTTON MOUSE	\$15
IOMST003	MICROSOFT INTELLI-MOUSE	\$95
IOMST004	GENIUS 3 BUTTON MOUSE - SER./PS2	\$25
IOLOG000	LOGI-TECH 3 BUTTON DELUXE MOUSE	\$35



Joysticks and Gamepads

Code	Model	Price
IOMST005	M/SOFT SIDEWINDER 3D PRO+ GAME	\$125
IOMST007	M/SOFT SIDEWINDER GAME PAD	\$75
IOLOG001	L/TECH WINGMAN WARRIOR	\$149

Scanners

Optic Pro

Code	Model	Price
IIIOGEN008	OpticPro 4830P 30-BIT flatbed 4800DPI	\$249
IIIOGEN009	OpticPro 9630P 30 BIT flatbed 9600DPI	\$299

AcerScan

Code	Model	Price
IOACE003	ACERSCAN 310 24 BIT-4800 DPI	\$235
IOACE004	ACERSCAN 610 PLUS 30 BIT-9600 DPI	\$395

Hewlett Packard 5100 IOHPD001 \$465

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Code	Model	Price
IOHPD012	5100 with Adobe Photoshop 4.0	\$655
IOHPD013	5100 with Omnipage Pro	\$675

Hewlett Packard 6100C IOHPD011 \$1235

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Software

Microsoft

Code	Description	Price
SWMST001	Windows 95 Upgrade CD	\$139
SWMST002	Windows 95 Upgrade 3.5"	\$139
SWMST003	Windows NT Workstation 4.0 - New user	\$395
SWMST004	Windows NT Workstation 4.0 - Upgrade	\$189
SWMST048	Windows NT Server 4.0 + 5 user	\$990
SWMST005	Microsoft Office 97 Std	\$635
SWMST006	Microsoft Office 97 Std - Upgrade	\$345
SWMST007	Microsoft Office 97 Pro	\$735
SWMST008	Microsoft Office 97 Pro - Upgrade	\$435
SWMST018	Microsoft Publisher 97	\$95
SWMST019	Microsoft Publisher 97 - Upgrade	\$65
SWMST044	Microsoft Project 98	\$679
SWMST045	Microsoft Project 98 - Upgrade	\$265
SWMST022	Microsoft Outlook 97	\$125
SWMST058	Microsoft Team Manager 97	\$585
SWMST051	Microsoft Home Essentials 98	\$159
SWMST020	Microsoft Frontpage 98	\$149
SWMST021	Microsoft Frontpage 98 Upgrade	\$75

Development Tools

Code	Description	Price
SWMST025	Visual Basic V5.0 Std Learning CD	\$129
SWMST063	Visual Basic V5.0 Pro	\$639
SWMST064	Visual Basic V5.0 Pro - Upgrade	\$325
SWMST065	Visual C++ V5.0 Std	\$129
SWMST066	Visual C++ V5.0 Pro	\$639
SWMST0	Visual C++ V5.0 Pro - Upgrade	\$319
SWMST023	Visual J++	\$119



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Code	Description	Price
SWSYM003	WinFax Professional V8.0	\$125
SWSYM004	PCanywhere V8.0	\$200
SWSYM008	Norton Utilities Gold Edition	\$105
SWSYM007	Norton Anti-virus 4.0 Gold Edition	\$89



Code	Description	Price
SWADD002	Adobe Illustrator 7.0	\$699
SWADD003	Adobe Pagemaker 6.5	\$965
SWADD000	Adobe Photoshop 4.0	\$969



Others

Code	Description	Price
SWGGEN001	LINUX 6 CD set	\$39
SWGGEN002	LINUX - Official Redhat	\$75
SWMFE000	MCAFFEE Virus Scan	\$69
SWMFE002	MCAFFEE WebScan	\$58
SWOZE000	OZEMAIL Internet Family Kit	\$29.95
SWOZE001	OZEMAIL Internet Starter Kit	\$9.95



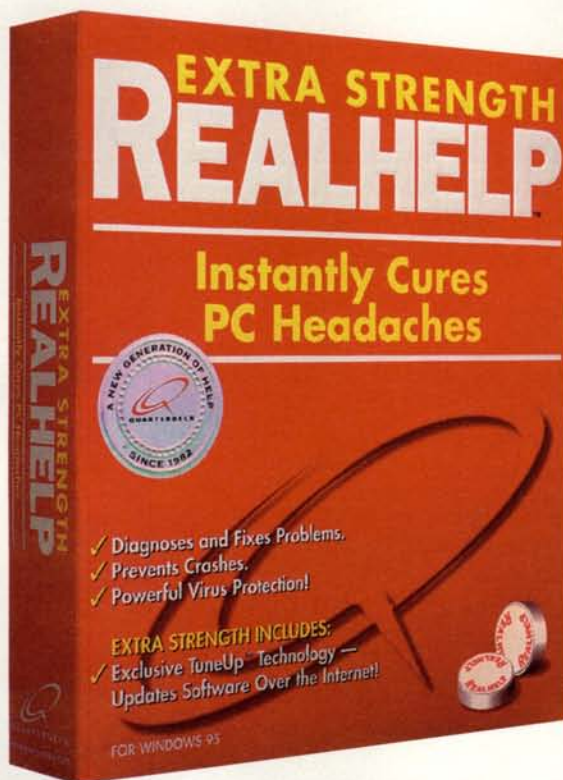


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SWQUA002	Partition It Extra Strength	\$99.95
SWQUA003	Virus Sweep	\$69.95

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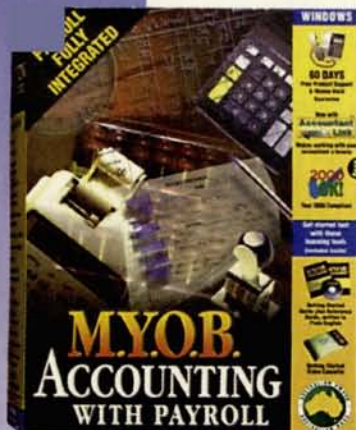
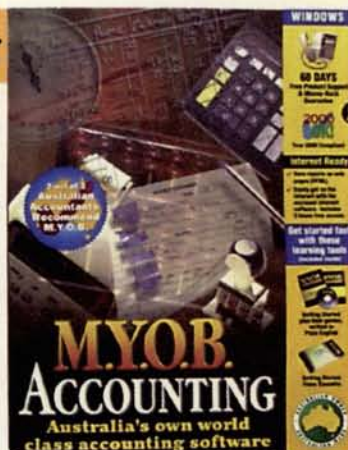
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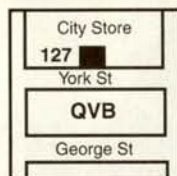
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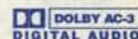
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Integrate Any Fax (or Modem) into any Telephone Line using your existing number and/or a FaxStream Duet number. Completely Automatic and Transparent operation, without Compromise. No special wiring, any device at any location. Your Callers will never know it's on the Line.



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Now you can connect your Modem to your Fax Line for fully automatic Bi-Directional operation. Or operate Two Modems on one line. Barge-In protection is provided to prevent one device crashing in on the other while it is in use.



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Automatic Voice, Fax and Modem all on One Line With Fax-Fax/Modem Link. EASY-CONNECT, FMX and SCAN MASTER all in one Product. Operates with your existing number and/or FaxStream Duet and Easycall Multiple Number. It's called EASY-CONNECT Pro.



FAX - FAX / MODEM LINK

At last, you can now interface your Fax Machine with your Fax / Modem to provide Document Scanning to Your PC, Hardcopy Print to your Fax. Ideal for OCR applications. The only fully automatic device on the market.



AUTO 2 WAY TELEPHONE SWITCH

This low cost unit provides automatic connection to the telephone line on dialing. Other device is then locked out. Ideal for connection of Modems, Security Systems EFT-POS, Fax/Modems to a Fax Line, Commander, PABX or any type of Telephone Line.



AUTO SELECT

The Auto Select will allow up to eight Modems to be fitted to ONE LINE, or seven Modems and one Fax on the same line. Incoming calls can be automatically routed to any of the 8 separate devices. Barge-in protection is provided to ensure that only one device can have access to the line at any one time.



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Now you can answer a call on any telephone and then transfer the call to another telephone fitted to the same line, using your existing telephones. You can even use your phones as an intercom. No special wiring required.



HIGH QUALITY TELEPHONE INTERCOM NEW

Interphone provides LOUD, CLEAR, telephone quality communication between ANY two ordinary telephones, which can be up to several kilometres apart. Communication quality is so good you can even use it for fax or modem data communication.



TELEPHONE LINE SIMULATOR

This compact low cost unit allows two telephone devices to ring each other and communicate without the need to connect to a Telecom line. Save 25c per call. Ideal for use in the Testing, Training & Demonstration of all telephone devices.



TWO LINE SELECTOR

Now you can connect TWO telephone lines (Telstra, Optus, PABX, ISDN or Tie Line) to one Fax, Modem, Cordless Telephone, Answering Machine or any Telephone device. Incoming calls will ring as normal on whichever line is free. You can even select which line you wish to call out on.



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The new RTA will allow you to call in on your telephone line and SWITCH ON and SWITCH OFF one or two separate electrical appliances simply by ringing your telephone line or using a touch tone telephone.



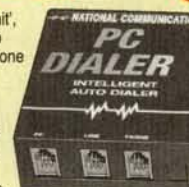
AUTO DIALER

This new 'line powered unit', which does not connect to power, will dial any preset number or prefix as soon as you lift the telephone device connected to it. Ideal for use as a courtesy phone, automatic prefix dialer or any other application where the same number is repeatedly dialed.



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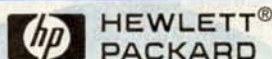
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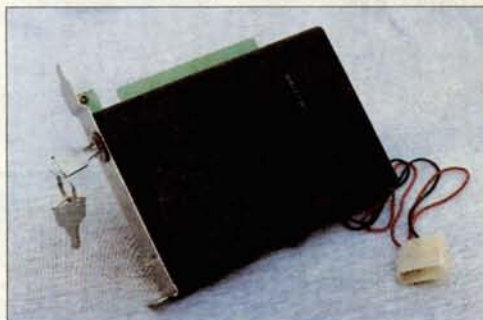
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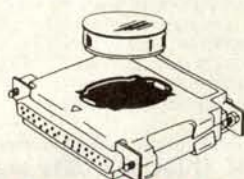
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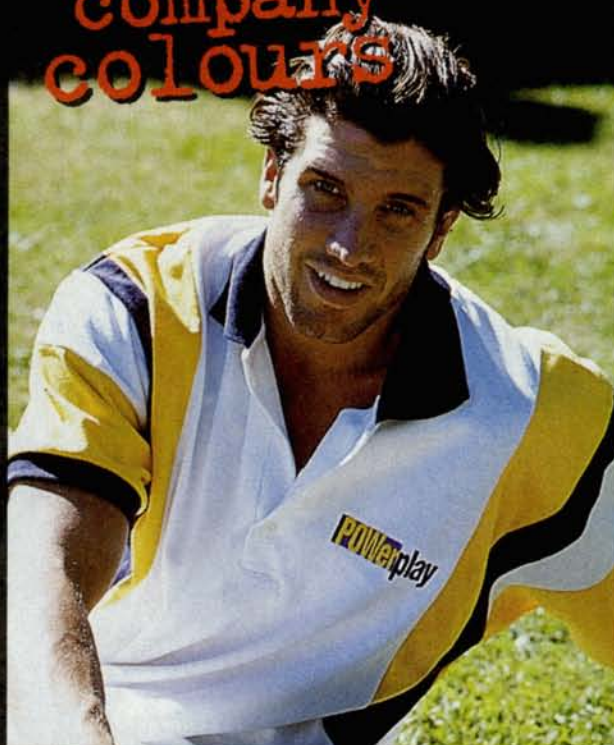
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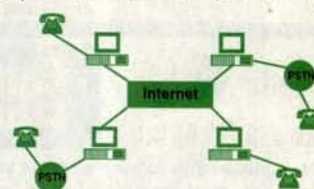
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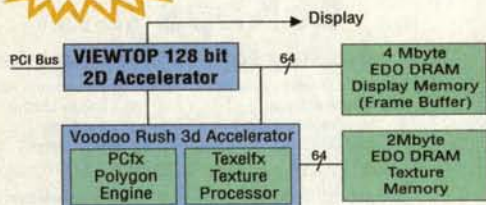
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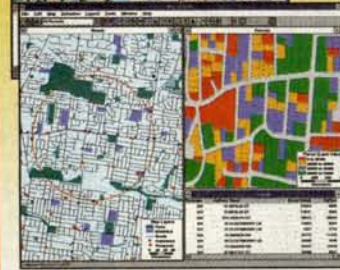
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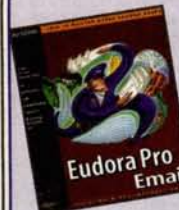
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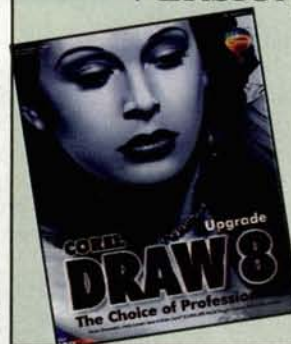
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The kit contains browsers, file-transfer programs, Mail and News readers and much more for each of the major operating systems. To make it as easy as possible for readers to get online, we've also included reader offers and a sign-up kit.

apcmag.cd aims to complement both the magazine and *APC*'s Web site. The concept is simple: when you read about a program in the magazine, such as a piece of software from a Shareware column, you need only insert **apcmag.cd**, browse it with your favourite WWW browser, and download the file directly from the CD. Articles which include related items on the CD are identified by the ● symbol at the top of the page. Each piece of software includes instructions on whether you will need to unzip the file before installing it; most also include Readme files.



Using the CD

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Phone: (02) 9288 9123

Email: KEdwards@acp.com.au

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Improve your HTML programming skills with
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Web authoring with HTML

HTML Stylesheet Sourcebook

Ian Graham's name will be familiar to those who love their copy of *HTML Sourcebook 3*. Now this technology specialist from the University of Toronto has applied his humorous writing style to his newest love — style sheets.

For creative Webmasters who find HTML too restrictive for their grand designs and page layout schemes, Graham has churned out just over 400 pages of tips, tricks and exercises that use style sheets to build dynamic and rich Web pages.

Of course, the back of the book screams the obligatory "for novices and beginners alike", but this isn't 100% true. Yes, there are a handful of pages crammed with lessons aimed at making the beginner proficient in HTML, but they are insufficiently explained, and use terms and HTML-specific phrases that beginners would not understand. A good working knowledge of HTML is assumed in every chapter except the one teaching HTML basics.

For a book about style sheets and design, this guide looks horribly bland inside. Big slabs of code and text and sudden changes in font and layout style on virtually every page are confusing to the eye and make it difficult to follow Graham's wise words. However, this is an unfortunate by-product of a book that is thorough and bursting with code and comment. Even the front and back covers are used as quick-glance guides.

Between these covers is an excellent guide to combining cascading style sheets and HTML that includes browser-specific tips for Version 4 of both major browsers, as well as discussion of the relatively new phenomenon of dynamic HTML.

Samantha Amjadali

■ **Author** Ian Graham
■ **Publisher** John Wiley & Sons



■ **Distributor** Jacaranda Wiley
■ **Phone** (02) 9805 1100
■ **Price** \$49.95
■ **ISBN** 0-471-19664-9
■ **Rating** ★★★★★

HTML 4 Unleashed

With hundreds of excellent HTML guides and tutorials freely available on the Internet, it is difficult to recommend paying \$90 for a book that is inevitably out of date by the time it is published. However, as far as a complete reference goes, *HTML 4 Unleashed* is a definite contender for becoming the beloved dog-eared bible of HTML gurus.

The book begins with 70 painful pages of HTML history, including everything from a rather dull explanation of non-linear information and the origins of Hypertext Markup, to the SGML declaration of HTML 4.0 and the developments made in past W3C-sanctioned versions of HTML.

While such topics may whet the appetites of techie Webmasters, newbies should head straight for Chapter 7 where they can learn about the structure of a

standard HTML document and begin learning the art of stitching together Web pages.

The basic HTML tags are adequately covered, as are their accompanying parameters. The book eventually moves from straight HTML to CGI, JavaScript, VRML, Dynamic HTML and Web page design and layout, offering just enough to allow you to competently incorporate portions of the new technologies into your Web pages.

HTML 4 Unleashed is the combined effort of 14 authors, and the writing styles, clarity of explanation and sample browsers used in examples vary from chapter to chapter. As the book was published prior to the ratification of the HTML 4.0 standard, it tends to jump between

Guide to ratings

★ Complete waste of time
★★ Don't spend too much time
★★★ A timely offering
★★★★ Make time for this
★★★★★ Better than Time-Tams (ouch!)

HTML 3.2 tags and proposed HTML 4.0 functions.

As with other books of this type, the source code for all examples is available on the accompanying CD-ROM, along with demonstration copies of several popular shareware titles and HTML editors (with the very notable exclusion of Navigator Gold). Netscape's popular Navigator browser isn't even offered on the CD-ROM alongside the Mac and PC versions of Internet Explorer 3.0. Electronic copies of Java 1.1 Unleashed and Laura Lemay's Web Workshops on ActiveX and VBScript are also included.

The remaining portion of this almost 1,000-page tome is a hotch-potch of goodies that do little more than pad out the book. Unless you are a true HTML fiend who relishes discussions of XML, internationalising your Web page and using HTML as an interface for other projects, or you can't access computer glossaries, quick HTML guides or the HTML 3.2 Reference specifications online, the last 200 pages are a waste of paper.

That said, *HTML 4.0 Unleashed* is a great reference for the technically minded Webmaster who needs an all-encompassing paper-based guide to everything HTML. If you simply want to whack up a Web page with the least fuss, save yourself \$50 and buy a *Dummies* guide.
Samantha Amjadali

■ Author	Rick Darnell et al
■ Publisher	Sams.net
■ Distributor	Prentice Hall Australia
■ Phone	(02) 9454 2200
■ Price	\$89.95
■ ISBN	1-57521-299-4
■ Rating	★★★★☆

HTML Web Publishing 6 in 1

If you have more than just a passing interest in the Web and would now like to design and publish your own Web page, then this is the book that will show you how. *HTML Web Publishing 6 in 1* is an easy-to-read, no-nonsense guide to Web publishing, and more.

The book is divided into six subjects, each containing around a dozen brief lessons that should each take about 10 minutes to complete. The lessons are easy to follow and include thoughtful icons that help you identify the most important pieces of information.

The first part of the book, 'Creating Web Pages', covers generic elements of Web publishing such as design considerations, how to enter body text and understanding links and URLs. It goes on to discuss Web graphics and animation, teaching you how to easily add flair to your newly created Web page using multimedia files or simple colours and text

styles. 'Enhancing Web Pages' teaches the very latest techniques, such as HTML style sheets.

The last three parts of the book deal with some of the more complex elements of Web publishing such as scripting and the basics of dynamic HTML. The book also explains how to design and edit Web pages using some of the most popular and functional Web publishing tools including Microsoft FrontPage Express, Netscape Composer, HotDog and PageMill, and Web graphics tools such as Paint Shop Pro, LView Pro and Gif-Builder.

The author, Todd Stauffer, has written other related titles including *HTML by Example, Using HTML 3.2* (second edition) and *Using the Internet with your Mac*.

HTML Web Publishing 6 in 1 will be an extremely useful guide to any novice Web publisher, and should also appeal to anyone interested in HTML and Web content in general.

Mario Tutone

■ Author	Todd Stauffer
■ Publisher	Que Corporation
■ Distributor	Prentice Hall Australia
■ Phone	(02) 9454 2200
■ Price	\$49.95
■ ISBN	0-7897-1407-8
■ Rating	★★★★★

In short

Dynamic HTML Power Guide

A concise, code-rich introduction to the new so-called dynamic extensions to HTML for hard-core Web developers. Includes concise review chapters to bring readers up to speed on cascading style sheets, JavaScript and VBScript. The publication also includes a CD with the latest Microsoft and Netscape browsers, and image and video.

■ Author	Shelley Powers
■ Publisher	IDG Books Worldwide
■ Distributor	Woodslane
■ Phone	(02) 9970 5111
■ Price	\$79.95
■ ISBN	0-7645-8053-1

Dynamic HTML for Dummies

With the help of *Dynamic HTML for Dummies*, Web page authors can deliver

interactive Web pages without the hassle of scripting languages and other complex tools. The bonus CD contains dynamic HTML editing software, lists of sample codes and tags, example dynamic HTML pages, templates and objects.

■ Author	Michael Hyman
■ Publisher	IDG Books Worldwide
■ Distributor	Woodslane
■ Phone	(02) 9970 5111
■ Price	\$59.95
■ ISBN	0-7645-0283-2

HTML Style Sheets Quick Reference

A desktop reference for all tags used to create style sheets as well as all existing HTML tags that can be used within them.

■ Author	Rob Falla
■ Publisher	Que Corporation

■ Distributor	Prentice Hall Australia
■ Phone	(02) 9454 2200
■ Price	\$39.95
■ ISBN	0-7897-1035-8

Official Microsoft HTML Help Authoring Kit

This title is designed for Internet and intranet Web site administrators and developers who want to give users integrated help systems, and for software developers who are moving their applications to distributed environments and need to maintain their help systems in a central location.

■ Author	Steve Wexler
■ Publisher	Microsoft Press
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Perspective: Media

Media Rants: Postpolitics in the Digital Nation

The Internet is widely touted as the communications tool that will provide us with immediate information on what is happening across the globe. But what impact will it have on our traditional news-gathering media such as the print media and to a lesser extent television?

Former media insider for the US 'CBS

Evening News' and *The Washington Post*, John Katz took a look at the impact of the Internet during the 1996 US presidential elections. The results spurred him to write *Media Rants: Post Politics in the Digital Nation*.

Katz and his team wanted to observe how presidential candidates used this new tool, whether it altered the way they ran their campaigns, and the impact it would have on traditional news reporting devices.

The results were surprising — there appeared to be little change in existing trends. The traditional media was still the primary force behind the campaign, and the Internet had little if any impact on the promotion of policies.

However, Katz believes there are signs this will not always be the case. The Internet in a journalistic sense allows for interactive reporting. This is quite different to traditional styles of reporting where a journalist can print their personal thoughts without having to face criticism or praise from the readers. The Net provides the means for the public to respond. Incorporate this style of interactive reporting into a future presidential election, and Katz believes candidates will be forced to listen to the important issues and adjust their policies accordingly.

Interactive journalism, as Katz terms it, presents both interesting problems and great opportunities. If this new type of journalism is to exist as it was intended, there are numerous issues that need to be addressed. The bulk of this book is devoted to highlighting issues such as freedom of speech, censorship and the need to limit corporate control. Some of these points are controversial, but will need to be debated as we approach the new millennium.

As a passionate believer in free speech, Katz acknowledges that the manner in which we receive our news and respond to it is changing, but reminds us that how much it changes is very much dependent on us.

Well worth reading.

Michael Taylor

■ Author	Jon Katz
■ Publisher	Wired Books
■ Distributor	Woodslane
■ Phone	(02) 9970 5111
■ Price	\$24.95
■ ISBN	1-888869-12-7
■ Rating	★★★★☆

Suck: Worst-Case Scenarios in Media, Culture, Advertising and the Internet

Based on the sardonic daily Suck column on the Web (<http://www.suck.com>), this latest Wired title features 32 of the site's most provocative rants. Regular Suck

columnists wax indignantly about tomorrow's TV (the merging of television today and the new medium of the Internet), advertising and marketing conspiracies on the Web, popular culture, the American political sitcom, and the pervasive nature of new technology.

If you are prepared to accept the overtly American focus, you'll find many of the columnists present hilariously funny, satirical and often indulgent rants. You will either love them or hate them, agree or disagree, but either way you're bound to appreciate the witty, well-written prose.

Read too fast and you risk missing terrific one-liners and analogies, such as Lotte Absence's column on sub-middle management worksick blues, where she shares her

experience trying to create a Web site for a "big company run by small people". Lamenting the slow hiring process, Absence writes, "As employment offers were known to sit on desks for weeks at a time, trying to get someone hired was on par with squeezing Pamela Anderson Lee into her swimsuit — slow going, but worth it."

One of my favourite columns was 'Nite Crawler', where author Justine (no surname given) shares her experiences during a sleepless night Web sojourn. Using AltaVista as her search engine, she managed to track the movements of her great lost loves. Dirk Van Hooeven scored nine matches — even though she was sure he would not exist in cyberspace — showing up in conference proceedings, official biographies and agendas. She found out he had moved cities and changed jobs, and even obtained his new work number. After initial success, she stayed online for another two hours, attempting to stalk her ex-husband, the second guy she slept with, her first SOB . . . Justine makes you realise just how simple it is to be furtive in cyberspace.

Coloured sideboxes provide further

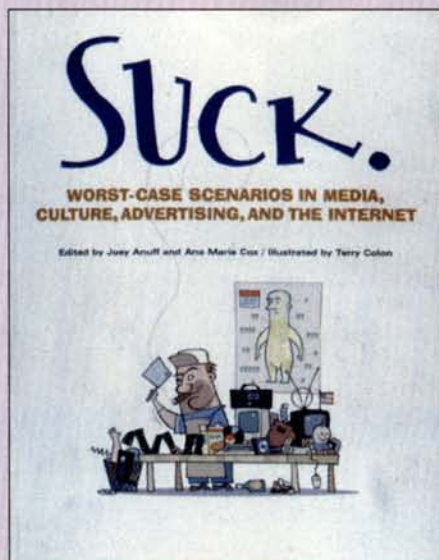
reading on material presented in the columns, and point readers to relative Web sites. Visitors to the Suck Web site will recognise the illustrations from art director Terry Colon, which reflect his unique style.

Fans of Wired publications will enjoy this affordably priced book. The editors certainly make no bones about "tossing spitballs from their gilded cage". Overlook the

many US-specific references, and you're bound to enjoy.

Cathie Kennedy

■ Editors	Joey Anuff and Ana Cox
■ Publisher	Wired Books
■ Distributor	Woodslane
■ Phone	(02) 9970 5111



Travel through time or to a new destination. **By Jeremy Torr**

Time travellers

Doctor Who — Destiny of the Doctors

This CD-ROM has a destiny, all right. I'm going to turn it into a flowerpot mat. I recently had a look at the BBC-produced Attenborough classic about Antarctica and voted it one of the best CD-ROMs I'd ever seen. This one sadly keeps the BBC average way down. Think of Wolfenstein in a beta version, throw in some largely irrelevant 'Doctor Who' trivia and video clips, a gratuitous comment or two from various Doctor characters, then downgrade the video to super-blocky, and you have some idea of what this thing is like.

The box blurb boasts bait galore for 'Doctor Who' fans such as the amazing City of Thoughts database, specially shot video and audio, plus all seven Doctors as well as the Brigadier and the Master. It sounds good, but the tedium you have to endure before you get there guarantees you will lose all capacity for thought. The challenges include: looking through a security camera, listening to the Doctor's throwaway *bons mots*, and walking about in a series of blocky Tardis tunnels looking for dull textual comments about other inhabitants of the universe. If you are a Doctor fan you will even be disappointed by the intro music — it isn't the famous theme.

Unlike the superb Star Trek CD-ROMs, there is no attempt to duplicate the feel of the series. This is a graphically disap-

pointing, shameless attempt to cash in. It should be shunned as a tacky piece of merchandising with very limited substance.

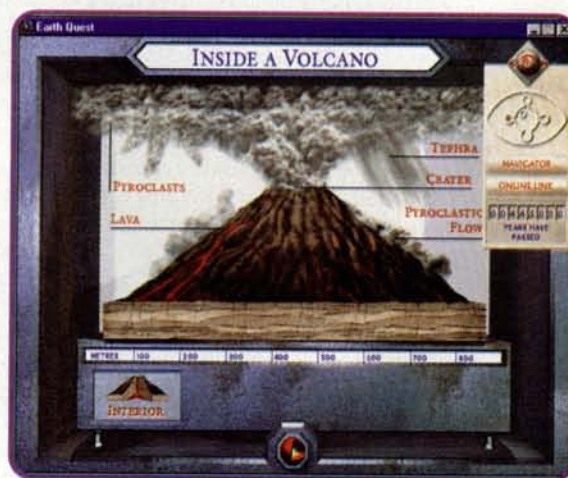
■ Publisher	BBC
■ Distributor	Roadshow Interactive
■ Phone	(02) 9552 8700
■ Price	\$69.95
■ Requires	Pentium 60 or better, Windows 95, 16M RAM, 50M hard drive space, 2x CD-ROM drive, 16-bit SVGA
■ Rating	★

Earth Quest

This CD-ROM is definitely one for the rock-chipper brigade. Not only do you get the chance to look at myriad gems, ores and mineral deposits from around the world, you get to see how a volcano works deep inside — and then set its parameters so it erupts all over your monitor. Top stuff. To the non-geologically oriented, though, it is not quite so catchy and mesmerising as some of DK's other titles, such as the superb Castle Explorer. It is much drier overall in its presentation (despite the background effects of constantly dripping water), and has less cross-linking and fewer quirky diversions.

The user can wander around in an underground grotto, indulge in a little interactive, 3D tectonic-plate challenge to rebuild the earth, or answer some quizzes about the gemstone resources of the African plate. But there isn't quite the interactive depth or eye-catching asides of some of its stablemates. The videos are helpful and informative, but once you've seen a wall of ore being blasted from a quarry, well, that's it.

One nice touch is the mineral alert button which pops up randomly to tell you that a lump of barite is forming, or that a stalactite has

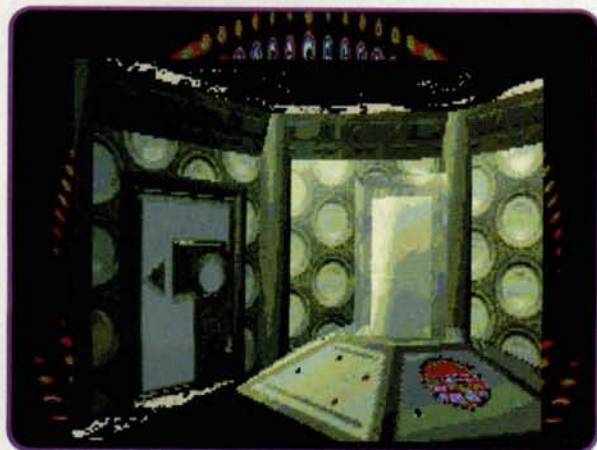


been born. You can then zip through time and rock to where the action is and watch the crystals form or layers build up to make a real deposit. Very neat. Other interactivity can be found at console desks where you can opt for a variety of growing or shrinking landscapes from volcanic islands to river canyons to verdant coastlines. A good gift for the gem hunter in your life.

■ Publisher	Dorling Kindersley
■ Distributor	Roadshow Interactive
■ Phone	(02) 9552 8700
■ Price	\$89.95
■ Requires	486/33 and up, Windows, 8M to 12M RAM, 13M hard drive space, 2x CD-ROM drive, SVGA
■ Rating	★★★

Colliers Encyclopedia 1998

Basing an encyclopedia on Netscape has good points and bad points. On the positive side, it presents a familiar and effective front end with all the search and bookmark options you could want, and also instant access to Net-based updates. On the negative side, it adds bulk, demands you load Netscape (even if you don't want it) and adds to the potential for software clashes if your PC is already crowded with programs. Nonetheless, for just over \$80 you do get a lot of stuff; Sierra claims 17 million words and a host of extras including video, animations, simulations and a



Interactive News

● The first DVD recording devices are just starting to filter into the market, and Panasonic is busy promoting its double-sided DVD-RAM drive. It can cope with almost any optical media including CD audio, CD-RW, MO discs and DVD. But the icing on the cake is that it can write in DVD format too. The only snag is that to get the accuracy of tracking required you have to use encased disc, much like the old MO disc format. This means much bulkier removable media than a writable CD-ROM, but with up to 8.5G capacity. Prices are not firm yet, but expect between \$1,000 to \$2,000 for the first wave.

● The move towards higher-fidelity speaker systems is gathering speed with most of the major speaker companies all edging into the computer market. This trend must only continue as the home entertainment and computer/Internet markets converge. We are now seeing Polk, JBL, Altec-Lansing and Sony all producing products specifically for the computer market. Good things to gamers all, with AC-3 decoding soon to be available on selected sound-cards for the ultimate surround simulation, if the rumours are true.

● Latest news from the set-top world-domination race is that

Yahoo has sunk \$US1.3 million into AudioNet, a Net-based narrowcast/push company. AudioNet provides live and on-demand audio and video broadcasts, which will now be integrated in the Yahoo site. And Samsung (if it can scrape together the hard currency to pay for the components) is moving in another direction with a new Web Video Phone, which allows users to send video as well as audio over the Net. It looks like a normal phone apart from the touch-sensitive LCD, miniature keyboard and EFTPOS card slot. Just log on, dial and chat while looking your correspondent in the eyes (modem speed allowing).

● And on the image-grabbing front, Olympus has just brought out the first SLR digital camera. It looks like a Luke Skywalker accessory, but saves heaps of battery life by only having to power up the LCD screen for post-snappy viewing, not while composing the shot itself. Other features are a zoom lens (35mm to 105mm), slip-in SSFD (solid state floppy disk) memory card, and the ability to print direct to a dye sublimation printer for top quality without a computer to process the images.

VR tour of a Mayan temple. Having a browser as the front end does occasionally slow things down, and entails plenty of whirring, loading and disc-swapping. There were a couple of occasions during testing when having the wrong disc in the drive gave the program a serious case of indigestion and crashed it.

On a lighter note, the program had good local content, and listed Uluru, Monash, Macquarie and even Flinders Street, Melbourne. Overall, the map sections are superb, with four or five-level drill-down from global to street corner for most major cities. The more factual entries are not as glamorous as, say, Encarta, with unadorned text and images and only a smattering of cross-indexing. The simulations are, well, there. You are unlikely to get too fired up about chemistry, cash flow or calisthenics using the examples on offer. Likewise, the timeline is textually solid, if not exciting — a characteristic of the whole program, in fact. If you want an immersive interactive learning experience, this isn't the reference for you. Looking stuff up, yes; intellectual meandering, no. But in terms of value for volume, it is still a good buy.

■ Publisher	Sierra
■ Distributor	Dataflow
■ Phone	(02) 9417 9700
■ Price	Approximately \$89.95
■ Requires	486/66 or better, Windows 95, 16M to 32M RAM, 50M hard drive space, 16-bit SVGA
■ Rating	★★★

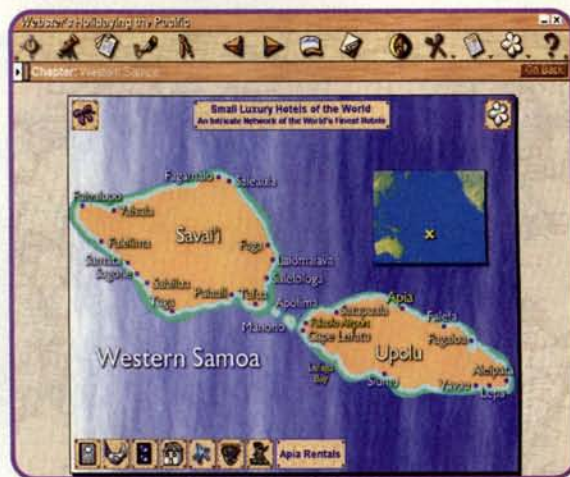
Holidaying in the Pacific

If you are thinking of indulging in the ultimate Pacific Island holiday, you could do worse than have a squiz at this CD-ROM. It does much the same job as the brochures you can get at any travel agent, but it does it all at the click of a mouse, it offers moving pictures, and it helps put all the areas you may want to visit into a much clearer perspective. Regional and local maps, climate details, geographic and other information are all the province of the data-rich CD-ROM, and these are all there for the asking. There are also videos of the local attractions, details of local companies doing everything from hang-gliding to snorkelling, and, of course, lots of accommodation and travel info. The ability to jump rapidly to another window is invaluable.

The commentaries and videos get a bit grating with their US-accented commentators waxing long and lyrical about separate bathrooms, paradise on earth and free voice mail, or telling you just how wonderful Olympus cameras and Air New Zealand are. In fact, there are quite a few infomercials scattered around on the disc. Still, you can skip over these and get down to some very useful hard info using the search facility.

The menu system is the usual Webster style — simple yet effective — and the videos are, in general, very good quality. The program also allows you to scribble annotations to pages for future reference, or to just make do with the supplied information and images. Hard copy can be produced from almost any screen, or you can set up your own slide show. This last would be ideal for travel agent window displays. Overall, a useful reference if you want to go island-hopping.

■ Publisher	PIP
■ Distributor	Webster
■ Phone	(02) 9975 1466
■ Price	\$29.95
■ Requires	486/100 or better, Windows, 8M RAM, 2x CD-ROM drive, 16-bit SVGA
■ Rating	★★★



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From jet fighting to Jedi fighting, we have it all in this month's GameZone.

Think of the Force

Defiance

The Avalon Hill Company was previously best known for hex-type war games, but this epic from its Visceral Productions division is of an entirely different nature. Defiance is a first-person 3D action/battle/strategy game which can be played by one person against the computer, or up to eight players can have multiplayer death-matches via the Internet.

Although it is of the Doom, Quake and Descent genre, Defiance is nevertheless quite different. In the futuristic 13-episode storyline you are an elite 'Core of Planets' soldier/pilot fighting a long war against the Anterran Premacy Worlds. Both sides are looking for supreme weaponry and you've been sent to a secret military research establishment to test out the new LIV-6 Sabre fighting craft — a Low-altitude Infiltration Vehicle — and it's a real treat to handle with either keys or joystick (or gamepad if you have one). I preferred keyboard and enjoyed the way the craft scoots along the ground, and can fly higher if you hold down the 'F' key.

The space bar fires the dozen weapon types, and you pick up more ammo and shields as you go. There are some neat weapons too — such as Plasma Bolts and Scatter Cannon — which leave permanent scars on walls, if they don't destroy them completely. Another nice visual effect is the huge waterspout when a cannon shot hits water. A voice-over during flight tells you what test manoeuvres to carry out and warns of impending danger. It's very easy to become completely immersed in the game with this level of interaction.

In a natty storyline twist, scientists at

the secret establishment have been working on producing 18 Cyborganic creatures which are devastating enough to finally win the interstellar war. Suddenly, funding for the entire project has been cut off and the chief developer has gone off his rocker, turning his creations against the military with disastrous results. What started out as a test flight for you now becomes all-out war against the mad scientist's hordes, and they're coming at you from all sides. It's pretty bloodthirsty too.

This game is rendered in Direct3D, and supports most 3Dfx accelerator cards. It looked great on the test Pentium 166 with its standard video card, coming up clean and crisp in my chosen 512 by 384 resolution. The excellent gameplay is enhanced by the between-level 3D movies, and there's a stunning movie at the conclusion.

Eric Holroyd

■ Distributor	Directsoft
■ Phone	(02) 9482 3455
■ Online	http://www.logicware.com
■ Price	\$70
■ Requires	Pentium 90, Windows 95, 16M RAM, 2x CD-ROM drive
■ Classification	M 15+
■ Rating	★★★★

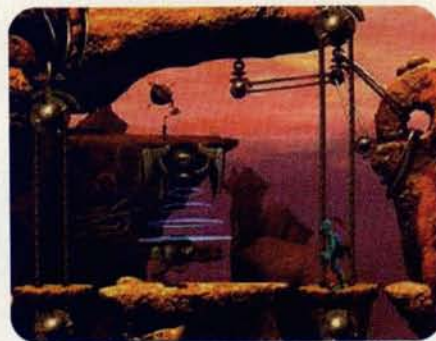
Oddworld: Abe's Oddysee

Every now and then a truly innovative game comes along. The wildly addictive Abe's Oddysee is just such a game.

For a start, it really is interactive, and in your travels through the seemingly endless scenes — each one graphically stunning — there are devilishly difficult puzzles to be solved. It's an action platform adventure, where it seems enemies lurk everywhere, so you need good reflexes.

Abe's Oddysee combines film-style storytelling with a GameSpeak system, where characters talk to each other in real time, and a SmartSound music track system, which ensures that the sound always matches the game's tempo.

The setting is Rapture Farms, Oddworld's meat processing facility where Abe is a worker. Having learned that the entire



Mudokon species is lined up to become the major ingredient in Rapture's new Tasty Gristle Treat pies, Abe escapes, teams up with a spiritualist Shaman and plots the downfall of Rapture Farms. His former boss, the unscrupulous meat baron Molluck the Glukkon, has 'kill on sight' soldiers including the wonderfully horrible Sligs, Paramites and Scrabs. Abe has lots of tricks and powers, but you have to figure out devious puzzles to acquire them. Fortunately, he has unlimited lives, and you'll lose quite a few trying to figure things out.

Abe's movements are beautifully controlled, you can tiptoe past an enemy as well as doing all the usual jumps, runs and crouches. In addition, 0 to 8 on the keyboard gets him to do such things as whistle, laugh, and say 'Hello' or 'Follow me'. Key 7 makes him fart — which definitely offends some enemies and may temporarily clear them away.

The gameplay doesn't move along predictable lines, making it probably the most playable game I've ever seen.

Eric Holroyd

■ Distributor	GT Interactive
■ Phone	(02) 9950 1555
■ Online	http://www.gtgames.com/games/oddworld
■ Price	\$89.95 (Playstation \$99.95)
■ Requires	Pentium 166, 32M RAM; 4x CD-ROM drive, SVGA graphics, Windows 95-compatible soundcard; for DOS: Sound Blaster-compatible soundcard
■ Classification	M 15+
■ Rating	★★★★★



Jedi Knight: Dark Forces II

This is an absorbing Star Wars game which follows on from Dark Forces I, in which the young mercenary hero Kyle Katarn successfully infiltrated the Empire. Now that he's made it there he must learn the mysterious ways of the Jedi.

You play Kyle, whose father was murdered by Jerec, the chief of seven Dark Jedi. This guy's just dying to know the location of a secret Jedi graveyard where he could harness the Force energy of thousands of Jedi Knights buried there. The secret would have died with your father, but he put the information on a data disk. The disk is currently in the possession of 8t88, a 'lowly calculation droid, or basic accountant' whose ambition is to become human with lots of power and money. You must find 8t88 before he escapes with the disk and sells it to the wicked Jerec.

Game style is of the Doom genre in that there's initially lots of darting around in passageways and laboratories shooting up lurking enemies and amassing weaponry. It's much more than that, though, as there are secrets in each level to be uncovered in addition to picking up ammunition and the various power-ups. One of the most vital components is the Force itself, and you only get Force Powers such as light sabre skills by gaining experience as you progress through the game. Experience points show up at the end of each mission as green stars on a special screen, which also shows your abilities and Jedi Rank.

You're also given a Morality standing here, depending on how you've performed so far. Killing innocent bystanders or droids, or choosing the Dark Side's 'Force Choke' instead of the Light Side's 'Healing', will tip your Morality scale towards the Dark Side. All this leads up to the point where you must take one side or the other.



Technically brilliant, with both first and third-person viewpoints and terrific graphics, Dark Forces II handles up to eight LAN players or four Internet players. 'Capture the Flag' is mind-boggling with eight battling each other, and is immensely satisfying in single-player mode too.

Eric Holroyd

■ Distributor	Metro Games
■ Phone	(03) 9329 2999
■ Online	http://www.vie.com/showroom.html or http://www.lucasarts.com
■ Price	\$89.95
■ Requires	Pentium 90, 32M RAM, 4x CD-ROM drive, 3D accelerator card recommended
■ Classification	M 15+
■ Rating	★★★★

Sabre Ace

A first-class air battle simulation, this is the only one I've seen that deals exclusively with the Korean War.

Aircraft such as the F-86 Sabre, the F-51 Mustang and the F-80 Shooting Star all flew many missions in Korea, and you may choose to fly any or all of them in this game. You fly and fight against the legendary MiG-15 and YAK-90. You can also



opt to fly either of those. There are 45 missions from the actual Korean conflict for you to fight, or there's a Custom Flight option for designing your own missions and aerial dogfights. All may be flown solo against computer opponents, or for real excitement, there's Multiplay for battling others by serial connection, modem or LAN connection.

All player modes have a multitude of set-up options; for starters, you can set the scenery for Sky and Terrain texture and the degree of shading and terrain detail. After that, up to 25 functions can

be allocated to your joystick. The game takes 67M of disk space to install, and when you start the game it takes around a minute to load the necessary data. During this time you're treated to some graphics of the various aircraft on both sides, which sets up the atmosphere nicely.

There's a training session for novice fliers which I highly recommend, after which you can go out on your chosen mission. During flight you can choose from cockpit view and a number of external views, and a neat map screen with flashing plane pinpoints your location. In this very realistic simulation even the type and number of enemy aircraft plus your visibility of them can be set up from the options menu, so when the MiGs are all around you the realism is intense. The overall sound and graphics are great too. My only gripe was with the hard-to-read (but otherwise excellent) manual which has strange title fonts and text overlaid on heavily backgrounded pages.

Eric Holroyd

■ Distributor	Virgin Interactive
■ Phone	(02) 9959 2301
■ Online	http://www.vie.com/showroom.html
■ Price	\$89.95
■ Requires	Pentium 133, 32M RAM, 4x CD-ROM drive, 3D accelerator
■ Classification	G 8+
■ Rating	★★★★☆

Streets of SimCity

There's more to playing this exciting car racing game than being first past the post. In Streets of SimCity you are a TV star producing TV programs based on your driving exploits. Each program contains a number of episodes that involve you undertaking a variety of tasks.

The aim of each episode varies,



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depending on the type of program it is. In 'Race for your Life' there is a specific course to follow and competitors to race against, while most of the other programs involve delivery of packages and evading pursuers. As you progress, your 'career' is automatically saved.

To keep you sane while you perform tasks and evade enemies, a snazzy car radio has DJs making quirky announcements and appropriate music playing. To help make things even more exciting (it is a TV show, remember!) you can equip your car with weapons and take on the opposition. These weapons include machine guns, missile launchers and mine droppers. Other modifications available include armour and a police radar. However, to modify and equip your car you need money, and to make money you must deliver as many packages as possible.

One advantage of the game is that you cannot die. While there is still time on the clock you can always regenerate your car whenever it's destroyed. Your own cities created in SimCity 2000 may be used with the Race Course Editor to make new courses. Another inclusion, the SimCity 2000 Urban Renewal Kit (SCURK), lets you build a new city, or modify an existing one, without money, population, time or development constraints.

Kieran McNamee

■ Distributor	Electronic Arts
■ Phone	(02) 9911 3322
■ Online	http://www.maxis.com
■ Price	\$89.95
■ Requires	Pentium 200, 32M RAM, 4x CD-ROM drive
■ Classification	G 8+
■ Rating	★★★★

Virtual Pool 2

It used to be said that being a good pool or snooker player was the sign of a mis-spent youth. Nowadays, most of the skills can be learnt in the privacy of your own home thanks to software like Virtual Pool 2.

I never played Virtual Pool 1, but for those who did, the sequel offers more than 50 new features, including a warranty which states that "Virtual Pool 2 is the only real-time 3D pool game guaranteed to improve your actual pool play, or your money back!" For starters, the whole thing is 3D photorealistic, and I was most impressed with the look and feel of the pool table itself. While 'walking' around it to check out the next shot, your first-per-

Games News

3Dfx branch out

The second generation of 3Dfx cards, using the Voodoo2 chipset, will be appearing on shelves sometime soon, and 3Dfx is looking to branch out into other areas as well. It recently announced that it will be producing a 3Dfx magazine called *Voodoo: The official 3Dfx Interactive Magazine*. There's no official word yet on whether it will be available in Australia, but Gamespy thinks the chances are good.

Doom source code

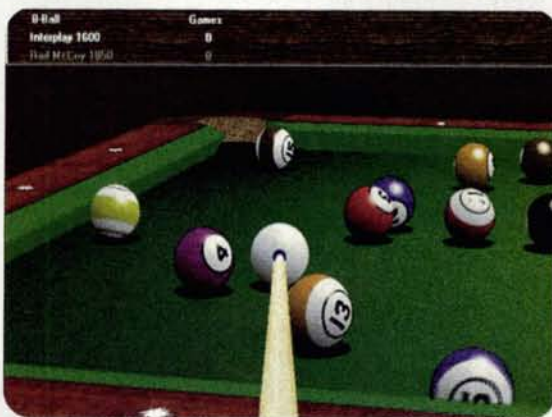
Just over four years after releasing Doom, John Carmack and id software have released the source code to their seminal game. In the fast-moving world of computers, and particularly computer games, it's not often that a game can still garner interest after such a period, but already plenty of people are buzzing about GLDoom as well as about ports of some of the more popular Quake TCs. Considering how many patches are still being pumped out for Quake 2, it might be just the thing to keep us happy until Q2 is 'finished'.

Microsoft back down? No way!

Microsoft, not known for backing down once it has an idea, has changed its mind in a big way concerning the great OpenGL versus Direct3D debate. Together with Silicon Graphics, Microsoft announced that it would be fully supporting OpenGL for all current and future Windows OSes. But this doesn't mean that it has completely junked the idea of Direct3D. Instead, it is saying that Direct3D will still be its focus for games. Ah well, at least it's something.

Mike Wilson becomes GOD

Mike Wilson, formerly of id software and lately CEO of Ion Storm, has left that company to start up his own in a slightly different area. The group is called GOD (Gathering Of Developers), and will be focused on publishing titles and looking after games development companies. His approach will be to put more money back into development companies' pockets by taking a smaller cut from royalties and offering knowledgeable support during the developmental phase of games. Gamespy



son view of the table changes as naturally as it would in real life, and when bending over the table and straightening up again, your viewpoint changes accordingly.

Ball control is achieved via a combination of mouse and keys. Pressing 'A' puts you in Aim mode, where you mouse left or right to change the view while sighting down the cue. Holding down the left-mouse-button lets you zoom backwards and forwards to check your aim. Shooting is done by holding down the 'S' key while drawing the cue back by moving the

mouse backwards. Mousing forward then hits the cue ball — as hard or as soft as you like. This may sound complicated, but is a breeze when you're actually playing, and the whole control setup is ingenious.

Screen display can be from low to very high resolution, and my mid-range choice of 800 by 600 showed the pool balls off to best advantage. There is even a whole series of videos in which top US players like Lou Butera teach trick shots and Mike Sigel instructs on strategy and specialty shots, so you have your own personal pool trainers.

Eric Holroyd

■ Distributor	Electronic Arts
■ Phone	(07) 5528 0500
■ Online	http://www.vrsports.com
■ Price	\$69.95
■ Requires	Pentium 166, Windows 95, 16M RAM, 4x CD-ROM drive, DirectX-compatible video card
■ Classification	G 8+
■ Rating	★★★★☆

Is bandwidth killing Net radio stars?

Turn on, tune in

NetRadio Network

Never find music you like on the radio? Try tuning into NetRadio, the largest Internet radio station, with an exhaustive 100 news and music channels. While online radio stations tend to have a local focus, NetRadio Network's outlook is decidedly global. Paradoxically, it's based in Minnesota, home to 'A Prairie Home Companion', arguably the best-known provincial radio program in the world. Since its launch in 1995, however, NetRadio has been in the top 1% of busiest Web sites, with listeners from over 90 countries.

The power of radio as a medium has always been its ability to reach targeted audiences, and the Internet extends this ability. NetRadio caters to every possible musical taste, from New Wave to Hawaiian. Listening requires Real Audio 3.0 or better, and FM stereo quality is possible with NetRadio's ISDN service, which requires a 56Kbps modem or better.

Music is NetRadio's strongest suit. The 100 channels are organised into 14 music areas, or genres, such as pop, classical, country, new age, vintage rock, jazz and world music. For example, the Industrial, Ambient and Dub Reggae channels all fall within the Electronica category. Some channels are live, 24-hour broadcasts which have new music added weekly, but most are pre-programmed shows, consisting of anything from two to 50 tracks. It's all music, so there are no announcers or advertisements.

Unfortunately, only a handful of channels have playlists, so you may not be able to find out what you're listening too. Tracking down songs you want to hear is a problem throughout the site — there is no way to search for your favourite artist and the channels have non-descriptive names.

The short, daily news broadcasts, some taken from the United Press International wire service, are categorised; topics include celebrities, information and sport. The advertisements on the site are tailored to the content, and close integration with the CD Point online music store makes it easy to buy — having listened to the sound samples of a featured artist, you can buy straight away.



While NetRadio certainly has the most extensive music range available, other content is a little lacking. The news is of variable quality, and background information on the artists featured would be a great addition. Another complaint is that advertisements on the site are not clearly marked as such. Despite these minor faults, NetRadio is still the best place to start tuning in.

Dominique Jackson

■ **Online** <http://www.netradio.net/>

■ **Rating** ★★★★★

Virgin Radio

It isn't ironic, but just like rain on your wedding day, it's hard to know where to place the blame that RealAudio broadcasting isn't much cop.

You can't blame the broadcaster or RealAudio, because the problem is that the bandwidth afforded by your modem can't stream the data at a reasonable rate. You can't even blame yourself, because paying an arm and a leg for something better just so you can hear foreign traffic reports is a bit extreme — you'd be better off buying a new stereo. Basically, you just have to accept the fact that it's going to sound exactly like a cheap transistor radio.

The Webcast of the London Virgin Radio station is just like any radio broadcast.

although it is advisable not to heed the time calls, because there's about 11 hours' difference. The only bonus is that you can download and listen to the last four breakfast programs at any time, should the home-grown morning mayhem not be enough for you.

And yes, the DJ filler between songs is inane the world over; you just get it with a different accent. The advantage is that since most of the daylight hours in Australia fall in the wee

small hours of the morning in the UK, tuning in at that time means that talk is kept to a minimum and the emphasis is on music.

Music-wise, it's the conservative end of the pop spectrum, with a mix of modern stuff and a few classic '80s tunes thrown in. For some reason, they also seem compelled to play the Sheryl Crow Bond theme 'Tomorrow Never Dies' several times a day.

One suspects that because the station is owned by Virgin, it's likely that it will feature a fair whack of artists on the Virgin music label. Personally, since many of my favourite artists are on this label, this isn't a problem, but listen too long and you may find your CD purchases are significantly contributing to Richard Branson's coffers.

Overall, Virgin Radio's site is simple, but that's the beauty of it. So sit back and



listen to that double shot of non-stop classic pop. Or something.

Kerrie Murphy

■ Online <http://www.virginradio.co.uk>
 ■ Rating ★★

MMM

With stations in most Australian cities, the Austereo network is the largest radio network in the country. It's also part of the Village Roadshow empire; and from its site at <http://www.village.com.au> you can access a number of the Austereo stations that have begun to stream their broadcasts onto the Net using RealAudio.

With its long history and high-profile announcers, Triple M is arguably Australia's best known rock'n'roll station. The familiar MMM logo can be seen on bumper stickers and concert posters all around the country. For loyal MMM listeners (and MMM listeners are very loyal), deprivation of their favourite music and DJs while they're at work may be too much. With MMM's RealAudio Netcast, listeners can tune in from their desktops; even Aussie travellers can keep in touch with their favourite station from overseas.

Listening to MMM over the past few months, I have noticed many references to the RealAudio broadcast and to The Village Web page that hosts it. To bypass all the noise of The Village, take a shortcut by pointing your browser directly at <http://www.mrock.village.com.au>. The site is very basic, but listeners can find whatever they want easily. The RealAudio broadcast is just two clicks from the front page, unless you need to follow the <http://www.real.com> link to download RealPlayer.

Over an ISDN connection the 16Kbps live stream was received without error. It sounded very good, although, unsurprisingly,

Surfbaud: Web voyeurs

Admit to it or not, we are all voyeurs at heart. Whether stealing a glance into someone else's bathroom cabinet or taking a quick peek over the back fence, there are few people who won't succumb when given the opportunity.

So it's little wonder that Web cams have an enormous following. From the legendary JenniCam (<http://www.boudoir.org>) to Netscape's famous tropical fish (<http://www1.netscape.com/fishcam/fishcam.html>), no matter how boring the topic may seem, someone, somewhere is always watching.

Take for example Jason's Cave Cam (<http://george.lbl.gov/cgi-bin/jason/cavecam/>) where you can keep an eye on some guy doing paperwork all day. It may be slightly less entertaining than watching someone formatting their hard disk, but, believe it or not, Jason has dozens of devout groupies who like nothing better than to drop by for their daily gawk.

If you've always wanted to see the world, but never had enough moolah for a plane ticket, a much cheaper alternative is Around the World in 80 Clicks (<http://www.steveweb.com/80clicks/>). Among the famous landmarks you get to visit are Notre Dame (<http://lisa.ee.nd.edu/DomeCam/>) and the Eiffel Tower (<http://www.tf1.fr/cgi-bin/tf1/maj.cgi?livecam&sommairefr.htm>), Mawson Station in Antarctica (<http://www.antdiv.gov.au/aad/exop/sfo/mawson/video.html>) and even views of our very own Sydney Harbour (<http://spectrum.com.au/citycam.html>). And you don't get jet-lagged!

What could be more scintillating than watching the technical gurus at Berkeley Systems washing their dirty

coffee mugs (<http://www.berksys.com/www/funtour/takepic.html>)? Or perhaps you would prefer to adore from afar the programmers behind Duke Nukem (<http://www.apogee1.com/camera/>) as they weave more magic in their offices?

If there is anything the Web does well it's showing off the quirky side of life. Steve's Ant Farm (<http://www.atomweb.com/antfarm.html>) is a strangely alluring look at a colony of ants setting up home. Pets can be highly entertaining at times. It's amazing how much mischief two fat cats (<http://www.catcam.com/>), a green iguana (<http://iguana.images.com/dupecam.html>) or a handful of turtles (<http://www.campusware.com/turtles/>) can get up to.

Of course there is a WebCam Ring (<http://webs.adam.es/alextc/lwc/lwc.html>) as well as plenty of guides to Web cams on the Internet, including the predictably named WebCams.com (<http://www.webcams.com/>) and NetCams.com (<http://www.netcams.com/>). And with the quirky comes the undeniably bizarre. One of the strangest sites is Horehus Webcam (<http://www.sel.ikke.no/horer/>), which shows fairly distant and fuzzy views of the entrance of a Norwegian brothel.

The prize for bizarre Web cam site of the Nite goes to ToiletCam (<http://habrok.uio.no/ToiletCam.html>), which claims to show the view from a hidden camera. It actually seems to be just a photo of a toilet, so I think this site is just a big joke; but a quick search with AltaVista will turn up plenty of other sites on the same subject — eek!

Samantha Amjadali



ingly, not quite as good as listening to the same transmission with a Walkman using the same speakers. Another difference is that the MMM RealAudio broadcast doesn't come in stereo format, only mono. This isn't really that big a deal if you're listening to the radio through PC speakers at low volume.

From a personal point of view, I would use the MMM RealAudio broadcast at home in place of traditional radio. This is because I live about an hour's drive from the Sydney transmitter, so it can be a little difficult to get a good reception in some areas of the

house. Despite a few dropouts, using a 28.8Kbps modem pretty much solves this problem.

The MMM RealAudio Netcast allows MMM listeners with a good Internet connection at work to avoid withdrawal symptoms between the time of Andrew Denton's breakfast show and The Rubber Room. Listeners with ordinary modem connections will get inferior quality to those using ISDN (and even this doesn't match a humble Walkman); however, sometimes any radio is good radio.

Kieran McNamee

■ Online <http://www.mrock.village.com.au>
 ■ Rating ★★★★★

Well, what would you do if an envelope filled with a suspicious sticky substance landed on your desk?

Chip Chat

Demon spawn

Chip Chat has a few problems with being sent amphibian material in the mail at the best of times, but this was something else. Late last year, our desk was bombarded with a Telstra Big Pond access kit, complete with a cute 'n' cuddly sand-filled frog. This was good. Then, a few days later, we got a disk covered in a mysterious sticky substance with a brief accompanying note: "Oops! In your Big Pond Frog Box we only included the Mac disk. Enclosed please find the Windows version." This was not so good, mainly because we had to spend a while washing our hands.

Closer investigation by our crack team of lab rats revealed that the stickiness was caused by sticking a new label on the disk using a substance described by one staffer as a "gluey, gloopy residue". We're torn between commending the company for recycling floppies, and pointing out that all that goop isn't very good for your floppy drive.

Gates admits: I'm not of this planet

While there are plenty of sites around which parody Bill Gates' question-and-answer syndicated columns, the actual column itself is starting to get so strange that parody may soon be redundant. Consider, for instance, this recent exchange:

Q. Is that true that you came from the future, through a time machine?

A. Yes, absolutely. But since you know that, you must come from the future, too. Let's keep it our secret.

If Bill is looking for a good joke, we suggest he take a closer look at some of his operating systems.

Terminal accounts

You don't wanna mess with the gang at Sybase; they're a bunch of database-driven dudes with attitude. Consider this quote from a recent release: "In the course of completing its audit of 1997 results, Sybase has learned of the improper revenue recognition relating to a number of

transactions by the company's Japanese subsidiary. All of the responsible individuals have either resigned or been terminated." We ask: where did they bury the bodies?

Viral infection

Computer viruses rarely rate a mention in the popular press, but add a dead royal angle and suddenly you could have reams of coverage. So it proved with the release earlier this year of the 'Lady Di' virus, a relatively benign beast which puts the lyrics for the first two verses of Elton John's 'Candle In The Wind' tribute record on the screens of numerous Spanish computer users. The improbably named Fernando de al Cuadra, of the even more improbably named Panda Software, told wire service reporters that this was a "nice" virus, since it didn't actually damage data stored

on the computer. Perhaps he should consider the possibility that people might vomit through exposure to the especially saccharine lyrics of what is now the world's best-selling single. (Not to mention the fact that it has managed to get itself mentioned in Chip Chat for two months in a row.)

Search engine madness: Why stop now?

Just for a change this month, we decided that we'd switch search engine tacks a little, and try out AltaVista's recently launched people search. Our advice: it's pretty good if you're looking for someone in the US, unless they're a well-known computing identity. Using it, we failed to find Bill Gates, Robert Palmer, Marc Andreessen or Lou Gerstner. So who said there was no privacy online? ■

Contest: You can get something for nothing

In their classic 1984 hit 'Freedom', pop group Wham! sang the immortal words "I don't want your freedom". Obviously, they had no idea how the market for Web browser software was going to develop over the next decade or so.

As we report elsewhere in this issue, Netscape has taken the browser bull by the horns and announced that its browser software is now totally free for all users. Not only that, but the company plans to make the complete Communicator source code available online, allowing people to tinker with it at will.

We're hoping that this will set a



trend, and to ease the process along we'd like to know what other products you think should be made available at no cost for unlimited user adjustments. Should Windows 95 be opened up to the masses? Or do we really just need the source code for Riven?

The best suggestion will receive a year's subscription to APC. Enter by sending email to

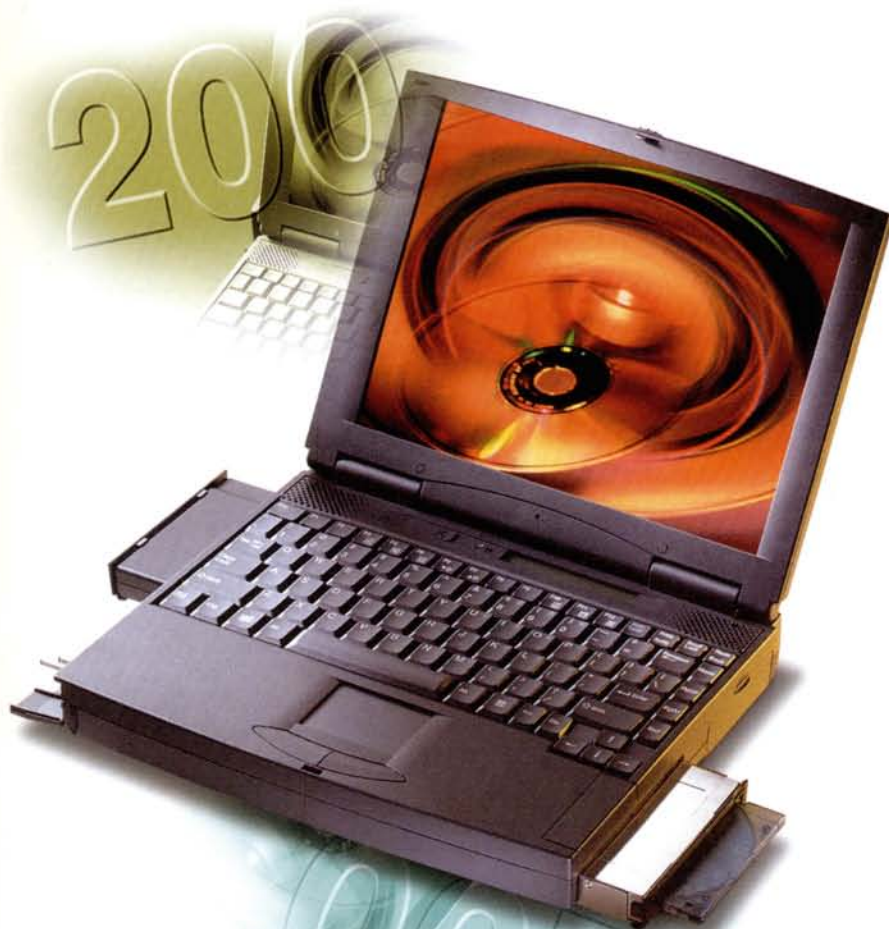
wham@acp.com.au, or write to Wham!, APC, Level 8, 54 Park Street, Sydney NSW 1028. Entries close March 18, 1997; the winner's name will be published on our Web site. For full terms and conditions, see page 194.

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